

# CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society  
Of America

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FIG. 1. Mr. and Mrs. Curt Backeberg,  
Volksdorf, Germany.



## CACTUS AND SUCCULENT JOURNAL

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## EDITORIAL

Your Editor is grateful for the many kind wishes received during the holiday season. The JOURNAL is his personal greeting to every member. It is a pleasure to receive the renewal of memberships at this time of year for the many kind notes and suggestions. Through popular demand, your Editor is retaliating by reprinting an article about himself from "Spine" magazine. This is the first kind thing that has been said about him in this first twenty years and at the end of the next twenty years it will make no difference! By the way, you should subscribe to this Australian quarterly because it is most readable and instructive. We would suggest that you send \$3.00 direct to the editor Lex Fuau, Arden Crescent, Rosanna, Victoria, Australia, or to this office for Volumes I (1948) and II (1949).

To date we have found that other cactus magazines, botanical gardens, and affiliated groups do not increase the membership in the Cactus and Succulent Society of America. In Arizona state we have only 12 subscribers. In San Marino we have one. Cactus dealers should be a source of new memberships since it has been the Society and its publications that has helped to keep alive interest in cacti and the other succulents. Since Kelly and Mrs. Bakkers dropped from the picture, only two other dealers have sent in subscriptions. Guy Quinn with his gift offer has sent in over 50 new memberships during the year—we are indeed grateful for his support. Johnson Cactus Gardens in Paramount, California, has sent HALF of ALL the new subscriptions that we have taken in from any source. There is actually no personal gain to either of these dealers but they have contributed to the cause. This shows what might be done if all dealers supported the American JOURNAL.

The JOURNAL was fortunately able to carry the torch and keep alive the interest during the war until the other magazines could resume publication once more. With the exception of *Kakteen Kunde*, the JOURNAL has had the longest life of any of the cactus and succulent magazines—and there have been many come and go within the last 30 years! We can boast that we are starting its second 20-year period with the largest circulation of any existing magazine. The new magazine of the Yorkshire group in England runs a close second and we will gracefully bow to them if their membership exceeds ours after they have pub-

lished their magazine twenty years! To date we can safely top any figures that have been published. These figures take into consideration the loss of 88 English subscribers who dropped the JOURNAL when their two magazines began publication. The Cactus and Succulent Society of America will continue as a mother society and gracefully bows to local groups when they feel the need of a bulletin of their own.

## Contributors

At this time we want to thank the many loyal contributors to the JOURNAL. Without their cooperation this magazine could not have endured the difficulties that have been presented these twenty years. We regret the loss of such regular contributors as White and Sloane, Eric Walther, Edgar Baxter, G. A. Frick, Dr. R. T. Craig, and J. R. Brown. The loss of these contributions mean the loss of interest in the *Stapelia*, *Echeverias*, *Opuntias*, *Euphorbias*, *Mammillarias*, and *Haworthias*, respectively. To keep interest alive in each of these and the other groups of plants, we need specialists and we hope that this year the Research Committee will accomplish one of its aims in finding and helping those who are willing, to specialize. In closing these remarks about contributors, we want to say that not once during the first twenty years has there been a shortage of material for publication; this is the key to its acceptance as the leading cactus journal of the world—thanks again to those who write for the JOURNAL.

## Forty Page Combined Issue

How do you like this issue for the months of January and February combined into one mailing? Three pages are saved by not repeating the cover pages and longer articles can be run without continuations. If this bi-monthly plan is continued there will be the following advantages: 1. More space for amateur material. 2. There will be no need to raise the price of the JOURNAL. 3. Foreign subscribers will receive the combined issues mailed in an envelope stamped with the latest commemorative stamp. 4. Expirations will be allowed time to renew before the next issue. 5. Will allow regular installments of *Blühende Kakteen* reprint. 6. Editor will have six extra months a year to work on Year Books and other books. 7. Half of the mailing costs are saved, all postage rates have advanced materially. With these advantages, will you

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FIG. 2. LEFT: *Pilocereus Moritzianus* (Otto) Lem. showing the stamens covering the throat while in *Coleocephalocereus fluminensis* (Miq.) Backbg. (RIGHT) they are protruding. The latter also shows the smooth, red, "lid-fruit."

## NEW WAYS IN CACTOLOGY

By CURT BACKEBERG

Translation by JOHN POINDEXTER

### *On Marshall's and My Systematic Revisions*

In the last chapter of my book, *American Cacti*, I said of the systematic discussion that it has always been the salt for the specialized scientist as well as the amateur. This is because attack demands defense and therewith provides a motivation for a thorough re-studying of the material. Without competing systems there would be no history of cactology. When we study the old writings we find that each author believed that he had found the correct solution, yet a new scheme always came. Occasionally there are disagreements, but they always take us forward.

As I look over the possibilities for further advances in the study of cacti, I see the development of more precise investigations which will increase the amount of detailed knowledge, and in the use of this more detailed information an improvement in the systematic arrangement of these plants.

Some say that one of the many regrettable consequences of the war just past is that the international exchange of ideas in our field has been interrupted for several years. This is true; on the other hand, this has also been an advantage, for during this period different concepts and ideas have developed further inde-

pendently of one another, and one can now see what dynamics are inherent in them and to what results they lead. According to the pre-war degree of intensity of cactus study, it is natural that the most progress in this work occurred in the United States and Germany.

This is shown by the publication of *Cactaceae* by Marshall and Bock in 1941, my revision in 1942, and further revisions by Marshall in 1943 and 1946. Marshall's and my revisions are the result of two entirely different lines of thought. The purpose of this paper is to review both of them and to undertake a critical study of Marshall's system, since the latter has already had the opportunity to criticize my work in the French Journal, *Cactus*, in 1946.\* I have not seen the systematic revisions published in the *American Cactus and Succulent Journal* in 1943 and later. It is my understanding that in general the system of Britton and Rose is used as a basis for these works and that these are modified along the same trend as Marshall modified them in his articles appearing in the French *Cactus Journal* in 1946. Therefore, I will consider Marshall's concept as identical with that appearing in *Cactus*, 1946, Nos. 2-4.

\*Also in this Journal in 1947

It should be stated in advance that any critique of systematic arrangements should be handled in an objective manner and with the highest degree of accuracy, and arguments should be limited to the material under discussion. The mere phrase, "Qualified Botanists do not accept this genus," is not an argument at all unless these botanists are cited by name and are actually qualified by extensive field work as well as experience with horticultural specimens. Only one who has traveled extensively in all the areas where the cacti grow is in a position to do original monographic work on this family; all others must work from the literature, or the limited material to be found in one region or in gardens and herbariums. It is also not sufficient to dismiss a genus with the mere phrase, "not sufficiently distinct." There should be at least a discussion of the characters involved in establishing the genus in the first place.

The crux of the differences between Marshall's and my systems is the genus concept. Marshall is tending toward the old "collective genera," and I am working toward small genera that are drawn on the most precise lines and which form distinct units. If in my answer to Marshall's work I do not defend my own genera, it is because they have been set up on very precise distinguishing characteristics in my previous literature. It should suffice to point out the errors in Marshall's work.

*The Classification According to Britton and Rose and According to Marshall*

Marshall and Bock held to the general systematic outline followed by Britton and Rose in the supplementary volume to *The Cactaceae*. This is understandable since it was a supplementary volume rather than a new work. There are no new trends apparent until Marshall began to develop his own system in 1943, and further revised this work with the rejection of nearly all of my new genera in 1945 or 1946 (It is not apparent when the work published in *Cactus* was written). Thus a classification developed which is considered as Marshall's concept, and this will be considered critically herein.

Although the basic plan of Marshall's system is the same as that of Britton and Rose, there is an obvious tendency to eliminate the small genera, lumping those species with the older "collective genera." The Tribes and Sub-Tribes of Britton and Rose are retained in their entirety.

It is my contention that such a system is not adequate to cover the relationships of the cacti. This is especially true when one considers Berger's work on the phylogeny of the cacti,

published in 1926.\* It is obvious that a thorough revision of the family from start to finish is going to be necessary even if we completely disregard the work done by Marshall and me.

The system of Britton and Rose follows the phylogenetic outline only in its most obvious aspects. It is a key, and an unsatisfactory one at that, due to its very artificial nature. This is especially obvious in the *Cereeae*, which is a haphazard arrangement of genera, especially in the spherical forms. Neither phylogenetic relationships nor the connections of genera with the groups of higher order are clear. The limits of the Sub-Tribes are often purely arbitrary. Many genera were so limited that they did not include all of the species of a natural group (for example, *Neoporteria*). This is not always the case, since they frequently made the boundaries of a genus so large that they include plants that are not so closely related. This is more often the case with Marshall.

This should not be construed as a criticism of the work of Britton and Rose. They stand and will continue to stand alone in this field by virtue of the monumental nature of their contribution as well as by the fact that they were the first to develop the principle of separating the cacti into small genera. This principle provides the key for the unraveling of the complex relationships to be found in the cacti and for the explanation of many of the distributional phenomena in the group. Britton and Rose were handicapped by the very magnitude of their job, and we are in a much better position today to carry on with their work as a result of the researches in the field of Marsoner, Stürmer, Ritter, Werdermann, Blossfeld, Jr., and myself, (as well as of the Americans: Gates, Akers, Dawson and Craig). Yet Marshall prefers to return to the artificial arrangement of Britton and Rose, giving the impression that no advances have been made in the interim.

For example the Tribe CEREAE begins not with the oldest forms, but these are placed anywhere, in the obviously haphazard arrangement of the genera. Thus *Carnegiea* is placed next to *Haageocereus* (U. S. A., Peru), *Cleistocactus* near *Rathbunia* (Andean Region, Mexico), *Aztekium* just before *Neoporteria* (!) (Mexico, Chile), etc. The Sub-Tribe ECHINOCEREANEAE is conclusive. In the key it is characterized by: "Flowers from lateral areoles." What is the situation in fact? I cite from the first three genera:

|                        |                         |
|------------------------|-------------------------|
| <i>Echinocereus</i>    | Flowers lateral         |
| <i>Acanthocalycium</i> | Flowers strictly on top |
| <i>Rebutia</i>         | Flowers from the base   |

\*Alwin Berger, *Die Entwicklungslinien der Kakteen*, Jena 1926.



(The flower position was noted by me: *Acanthocalycium* was placed here by Marshall.) Hence the key is in error.

The Sub-Tribe concludes with *Echinopsis*. Entirely separated in the Sub-Tribe CEREANEAE, approximately in the middle, stands *Trichocereus*, although we know that in nature these two genera intergrade with each other, and that my genus *Pseudolobivia*, lumped into *Echinopsis* by Marshall, is more easily distinguished from *Echinopsis* than *Echinopsis* from *Trichocereus*. Why is the one plant group in the CEREANEAE and the other in the ECHINOCEREANEAE? And then the distribution; in the ECHINOCEREANEAE one finds plants from Mexico, the United States, Argentine, Bolivia and even Peru arranged one after the other. *Echinocereus* obviously does not belong here.

These examples, which might be expanded indefinitely, may suffice to show that the basic system of Britton and Rose, and of Marshall are not satisfactory in the light of our present knowledge.

In addition, however, Marshall has begun to destroy the greatest advantage of the system by Britton and Rose, namely the sharply defined small genera, and to reestablish some of the old collective genera which are not known and are unrecognized. This confusion may only be cleared up through the synonymy (which is partially erroneous). Here and there we have reached again the old style collective genera such as *Cephalocereus*, which like the Tribes and Sub-Tribes of Britton and Rose are nothing but collective groups.

#### *The Generic Review of Marshall*

As I said above, it is hardly necessary to support my genera in view of the amount of material already in the literature. It is sufficient to show the inconsistencies of Marshall's system, and I will limit myself to this.

In the introductory section Marshall states "Backeberg further complicated matters by advancing a theory that the place of origin of the Cactaceae was the West Indies and that the family spread from there in two tides, one to South America and the other to Mexico, and through Mexico to the United States. Therefore, according to his reasoning, no genus could be found in both North and South America. The fallacy of his reasoning is proved by the undeniable presence of exactly similar forms of the genus *Opuntia* in both ranges, the extension of the genus *Cereus*, predominately South American, into the Northern Hemisphere, the presence of species of *Pereskia* in both Mexico and South America. . . ."

Unfortunately I can't answer this very ex-

actly as the material is entirely too comprehensive. In order to do this one must examine the whole question in my writings in order to see the problem in its entity, entirely aside from the fact that my statement was not as cited above, but was repeated from a misunderstanding. To explain my thoughts in brief, the following will suffice.

The present climate has certainly not been constant since primitive times. That is shown by the fact that cacti now exist in areas which were covered by glaciers in the North American glacial periods. This is not a theory of my own, but an application of the earth reconstruction maps by Alfred Wegener. According to this reconstruction, only the tropical type of climate could have existed in the Central American area during the Cretaceous period (in which the cacti must have appeared). According to my reconstruction the more primitive *Opuntiae* must have developed along the margin of this tropical area in the dry regions. On maps 2 and 3\* which appear on page 32 of *Zur Geschichte der Kakteen*, one arrow of the *Opuntiae* development is pointed right at the dry region of the northern deserts in the direction of Utah.

Consequently I consider it a sensational not to say highly agreeable circumstance for me that two years after the publication of this reconstruction the first fossil cactus to be found was discovered from the Eocene at Douglas, Utah, and was described by Ralph Chaney in the *American Journal of Botany* in 1944, under the name *Eopuntia Douglassii*.

The theory of the expansion of the cacti in the direction of the two poles likewise was not developed by me, but is the well established theory of Irmscher of the bi-polar outward streaming of new forms from the more primitive forms in the tropical regions. Further developments occur quite naturally: as the climatic belts wander, changes occur. In this manner complications arise, discontinuities in distribution, etc., which can only be studied through painstaking reconstructions of the climatic conditions in the past together with the developmental history of that group. For example, the *Opuntias* are primitive plants like the *Pereskias*. Both wandered quite freely within the tropical zone and its margins. Therefore they are distributed over a wide area. The spherical cacti are, to the contrary, relatively young forms which developed later and apparently at different times, independently of each other in the northern and southern regions. They are representatives of reduced stages from the dry belts on either side of the tropical belt. More details

\*Shown on pg. 6, this JOURNAL. Fig. 3.

concerning this basic plan for the evolution of the cacti as well as discussions of many of the complications in the later development of the cacti may be found in *Zur Geschichte der Kakteen*. Without these observations one cannot create a satisfactory picture of the cactus evolu-

tion. Even Britton and Rose showed that there was a difference in North American and South American *Opuntias* by separating them in their key, even though these differences are so slight as not to merit generic distinction.

*To be continued*

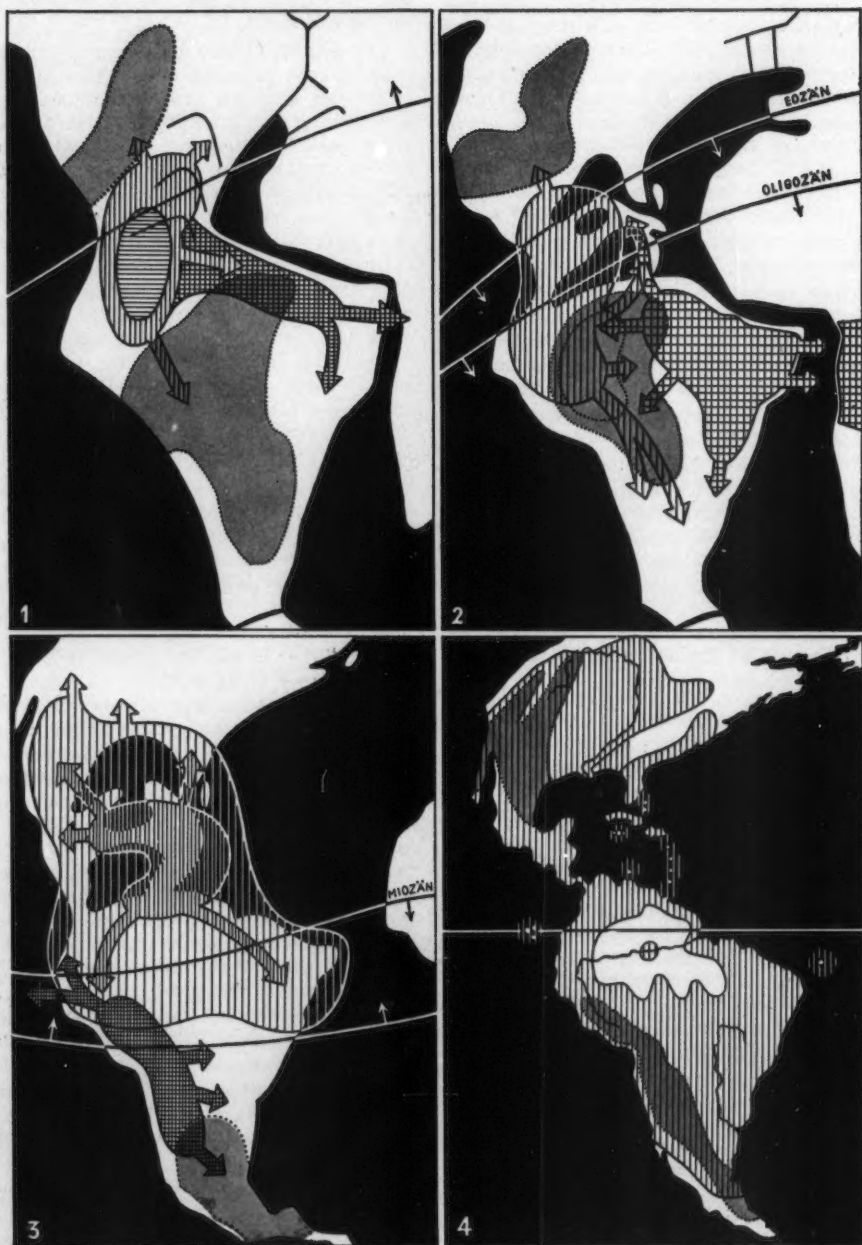


FIG. 3

## The Probable Original Areal of the Cactaceae and the Directions of their Distribution

(key to the adjacent maps)

From pages 32 and 33 "Zur Geschichte der Kakteen" in "Cactaceae" 1942, Zweiter Teil,  
Dec., 1942. (Year-book of the German Cactus Society.)

### Map

1

#### Cretaceous:



: The probable starting areal of cactus development between the two dry regions of the Cretaceous. It lay somewhat westerly and somewhat south of the Equator.



: The probable starting areal of the *Pereskioideae* (the primitive Pereskias).



: Probable differentiation of the oldest *Cereoideae*: The primitive areal of the *Rhipsalidinae*. (This outward expansion must have occurred during the transition to Paleocene times.)

2

#### Eocene to Oligocene:



: Starting areal of the *Opuntioideae*. Development toward the end of the Cretaceous and directions of the first main expansion, especially of the more primitive genera. As the tropical belt migrated southward, the *Opuntias* were pushed southward, probably in the west at first, as the Andes were in the process of uplift. There was a slighter push toward the Northern Hemisphere.



: The *Rhipsalidinae*. Probably the oldest had already made the migration to Africa in the Paleocene era. The expansion toward the South probably coincided with southward migration of the tropical belt in the eastern part of the continent. As South America and Africa separated, the higher forms continued their development in the South American tropics. As dry areas began to develop in the East, *Rhipsalis* species were forced westward.

3

#### Pliocene to Quarternary:



: Probable expansion areal of the older *Cereoideae* in the Cretaceous. North of the equator in the sub-tropical transition zone, it must have been pushed southward very rapidly with the southward migration of the tropical belt.



: Area of the more highly developed night blooming columnar cacti of the northern section comes into being. This is the first major step in the history of the *Cereae*. (As a result of a later migration of the tropical belt to the north, we find today some representatives of this group south of the equator. The penetration into Mexico came at the last, with the development of the Mexican areal of the northern spherical cacti.



: Probable first great areal of the southern developmental stages of the *Cereoideae* (the beginning must have been still earlier, probably in the Miocene).

4

#### Present time:



: Present general distribution of all of the cacti for comparison (African *Rhipsalis* not included).



The Dry Areas (Maps 1 to 4).

### Editorial—from page 2

cooperate until costs have been adjusted to the level at which the JOURNAL was priced at \$3.00 per year?

#### Year Book

Progress is being made on the "Year Book" and some of the proposed articles are as follows: *Terrestrial Bromeliads* by Mulford B. Foster; *Mesembryanthemum and Some New Genera Separated from It* by N. E. Brown in the *Gardeners' Chronicle*; *Cacti of Argentina* by Hoseus; Monograph *The Morphology of the Cactaceae* by Dr. Franz Buxbaum; *The Significance of Soil Reactions* by Dr. L. E. Blanchard; *Three Hundred and Fifty Years of Succulent Literature* by R. K. Byrd; and many other large projects. Continued cooperation and enthusiasm of our members will make this soon available.

#### This Issue of the Journal

"New Ways of Cactology" by Curt Backeberg is the first of a series in which his theories in nomenclature will be presented in English for the first time. There are also many photos and notes explaining his new species and changes in nomenclature that have not been understood here in America. Students will get more from this series if they secure all of the available literature with the many fine photos by Curt Backeberg.

The travelogue by Dr. E. Yale Dawson is attracting very favorable comment. The first two installments are still available (50c) at the JOURNAL office, Box 101, Pasadena, California. Many of us may never see this cactus country and we are most fortunate to be able to share this trip with Dr. Dawson—and in the luxury of an arm chair!

#### Amateurs

We recognize the importance of more articles written for beginners, students, florists, etc. With only sixteen pages, it is difficult to have the space for the timely new discoveries and the popular articles, too. We have contended that most of the cultural information and classification has been presented in books written for the amateur or has appeared in back issues of the JOURNAL. For that reason we have hesitated to repeat this same information. Beginners must use these reference books if they want a better understanding of their plants. John Rodgers' and Lad Cutak's pages have been found very helpful and the letters of appreciation are the only thanks that these two loyal writers get for their constant work. This year we are looking for more amateur articles on special culture for the colder climates and your own experiences will encourage others to send in theirs. Also, who will volunteer to edit and review the vast amount of cultural information that has been printed in the bulletins of the many local groups? The second need for 1949 is someone to edit a "Question and Answer Column"; copy must be perfectly edited and typed—who volunteers? As a final suggestion to students, as you read the JOURNAL, look up the pictures in reference books, of the plants mentioned and soon you will be familiar with a surprisingly large number and your reading will have much more value to you.

#### Binding and Back Issues of the Journal

Because of the high cost of binding and inferior workmanship, we will not bind the JOURNALS this year. We are trying to obtain spring binders in which to assemble the magazines as issued and hope to offer them to you before long. Many of the back issues of the JOURNAL are out of print and we are endeavoring to reprint enough to make complete sets available. We have already reprinted eight numbers of Volume I. After we have assembled the complete sets we will

offer to subscribers the odd copies; we will list these with a summary of the important articles in each available issue—many of which will be most valuable to beginners as well as to those who are specializing. Single copies of the last two years are usually available at the regular price. New subscribers will receive back issues from the January number unless otherwise requested.

#### Reprints and Advertising

As a service to those who desire reprints of their own articles, we have established the following prices: \$1.00 per 100, per page. For instance, 200 reprints of a four page article will cost authors \$8.00. Rates for advertising: \$3.00 per column inch per issue (Jan.-Feb. issues are treated as a single issue). Those dealers who feel that the JOURNAL helps them indirectly may contribute \$25.00 per year and will be listed as "Contributing Wholesalers." This year we will not accept advertising from any dealer after we have had two complaints of poor service.

#### Proctor's Pictures

Be sure to get the February *Arizona Highways* for its feature articles in color: "Orchid Cacti" by Mrs. Proctor, "The Night-blooming Cereus" by Mr. Proctor. You can obtain this magazine for \$3.00 per year by writing to Phoenix, Arizona. Another illustrated story by the Proctors is called "Orchid Cactus—Glamour for the Window Sill" in the February issue of *The Farm Journal*, Washington Square, Philadelphia. (Send 10 cents direct to this address in Pennsylvania.) The several million circulation of this *Farm Journal* should be a boost to those interested in Orchid Cacti; the authors generously mention the Cactus and Succulent Society or the Epiphyllum Society whenever it is possible. Did you see the two color pages in the January 4 issue of "Look" magazine? You may still find it in the second hand magazine stores; it is well worth having. *The Geographical Magazine* of England, 91 Saint Martin St., Martin Lane, London WC 2, has a three-page spread in color in the January issue. This is one of the finest showings of the Proctor's famous pictures of cacti.

### OUR 1949 CONVENTION

Our Convention site in the heart of the giant cactus country was made to order by Mother Nature. Just outside of Phoenix which is now a modern city of nearly a quarter million, she threw up several hills of red conglomerate and one of granite with gently rolling ground in between. A couple of miles to the north, she tumbled the rocks into the head and hump of recumbent Camelback Mountain. Then she placed rugged mountains in the distance to frame vistas of broad valleys, culminating her efforts in the rugged ramparts of Supersition Mountains on the eastern sky line. After declaring that her handiwork was good, she dressed the scene with desert trees and shrubs and finished the task by scattering the seeds of the saguaro, the barrel cactus, the iron wood, the palo verde and last but not least, the cholla or jumping cactus. The last named is said to be responsible for the large hole in the rock of one of the hills. A tender foot visitor backed into one of these villains and was prompted to jump away so fast he went right through the hill.

Later when man began to appreciate the beauties of the Valley of the Sun, our paternal government set aside several thousand acres as the original Saguaro National Monument. Still later this tract was turned over to the State of Arizona to become the present day



Papago Park. A new Saguaro National Monument was set up near Tucson. Swedish Gustav Starck loved the native flora of his adopted home and longed for a place where it might be preserved and cared for with a tender hand that all might see and enjoy. He gathered together a number of kindred spirits into the Arizona Cacti and Native Flora Society. This group induced the state to turn over to it, three hundred and six acres in the heart of Papago Park for the Desert Botanical Garden. Under the leadership of Gertrude Webster, the administration building, now known as "Webster Auditorium" was designed with an Indian motif and erected out of the native adobe. George Lindsay, as the garden's first director, planted out a fine assortment of plants from all over the world between the centuries old giant cactus and under the palo verde trees to the north of the building. Against the walls of the southern patio, he planted night blooming cereus with clustering globular and columnar types in the foreground. Of necessity, improvement and expansion was halted for several years during the war, but even war could not keep the plants George had planted from growing into magnificent specimens. When times had returned more nearly to normal, our President Emeritus, Wm. Taylor Marshall, was called to take up the director's work. He turned the long slope of Hole in the Rock Hill into a garden of native Arizona plants and searched the rugged reaches of the state for specimens so rare few cactophiles have ever seen them. In what he calls "the north forty" he has planted the specimens from the Webster collection and is grouping various species in generic groups. So today, no place has a better collection of desert plants.

It is expected that all our convention sessions will be held in Webster Auditorium. The serving kitchen opening off the assembly room, will permit caterers to serve all in between session meals right on the spot. We will not try to tell you of the other attractive features of the garden and building. It will be better to come and enjoy them. Next month, we will tell you of our unusual lodging headquarters. Remember the dates, July 2-5, 1949.

HOWARD E. GATES, Corona, Calif.  
*Convention Chairman.*

EDITOR'S NOTE: Dr. G. L. Berry, Lawton, Oklahoma, has suggested that a booklet be prepared of members' gardens or collections that welcome visitors. As a beginning we suggest that a list of gardens en route to the 49 Convention be published in the JOURNAL. If you want fellow members to stop and visit you, please send the following information to Dr. Berry: your name and address; any restrictions as to days you cannot see visitors; size and nature of your collection. This list should be published in the March issue, so please send in your listing now.

### BOOK REVIEW

By DR. LOUIS E. BLANCHARD

"SEED AND POTTING COMPOSTS with Special Reference to Soil Sterilization." Edited by W. J. C. Lawrence and J. Newell. Illustrated. 136 pp. London, England. George Allen and Unwin Ltd.

Many different composts are unnecessary and confusing. A good standardized compost will produce healthy and vigorous plants in the vast majority of varieties. It must have good physical structure (crumbly), and be able to hold sufficient moisture and permit good drainage. It should provide adequate, balanced, and continuous food supply and should be free from harmful organisms and toxic substances.

Such a compost may be prepared by the use of loam,

humus, and coarse sand. Leaf-mould is a fine source of humus when pure, but its composition varies according to its source, manner of storing and degree of decomposition. The same holds true for stable manure—all samples will vary. Peat is the ideal source of humus and is quite uniform but low in food value.

The following proportions produce correct physical conditions:

#### Seed Compost:

- 2 parts by bulk medium loam.
- 1 part by bulk peat (or leaf-mould).
- 1 part by bulk coarse sand.

#### Potting Compost:

- 7 parts by bulk medium loam.
- 3 parts by bulk peat (or leaf-mould).
- 2 parts by bulk coarse sand.

A balanced fertilizer is added to maintain the proper nutrient level and lime may be necessary to bring up the pH to 6.3

Soil sterilization (pasteurization), is essential for best production. Various techniques and methods are described and illustrated. Steam provides the best system of sterilization. Chemical methods are not as efficient. The soil temperature should be raised as quickly as possible to the sterilizing point for a limited period. The minimum is 180° F. for 10 minutes. This technique will destroy harmful organisms and prevent the excessive formation of fertilizing materials produced by increased chemical activity and selective bacterial action. Sterilization alters the soil physically, chemically and biologically.

The book is well written, its principles are sound and should be very useful to those interested in modern horticulture.

The authors do not discuss the modern spraying materials for greenhouse use nor do they mention the leaching that we find necessary after sterilizing soil in benches. When leaching is employed, a high temperature may be kept a little longer and there will be no weeds to contend with. Toxic products and excess soluble salts will be washed away. It is interesting to note, that after soil sterilization we frequently obtain very active growth of algae and fungi that sometimes completely cover the soil. These organisms represent air-borne contamination, are not pathogenic and disappear when the regular soil flora return and thus restore normal competition for life.

#### FROM ENGLAND

The above mentioned book has little bearing on cacti and succulents, but the principles are quite sound and can be applied to our favourites very successfully. Only small modifications are needed, as for example, in the soil for adult cacti. I found that the formula needed less loam and some broken brick added. That was for this country. Probably conditions in America are sufficiently different to warrant some other changes. But I am a firm convert to the idea of sterilization, followed by addition of minerals to re-balance the soil. The rewards are out of all proportion to the work involved.

C. R. HANCOCK.

KAKTUSBOKEN—G. M. Eklund. Stockholm, 1935-1936. Two volumes in Swedish. The first deals with the history, morphology, and cultivation of cacti. 216 pages and 141 illustrations mostly from photographs. The second volume contains the descriptions of the genera and species. 213 pages and 133 excellent photos. Reduced from \$4.75 to \$2.50.

#### ABBEE GARDEN PRESS

Box 101 — Pasadena 16 — California



FIG. 4. Types of moderately fleshy succulents, five families represented: Cactaceae, Liliaceae, Piperaceae, Bromeliaceae, Amaryllidaceae.

## WHAT IS A SUCCULENT?

By LADISLAUS CUTAK

Reprinted from *Missouri Botanical Garden Bulletin*, September, 1948.

Succulents are now an essential feature of almost every flower and garden show that is staged in this country. However, it is only within the last few years that they have become popular and that their suitability to so many purposes has been appreciated. Yet the term "succulent plants" is still somewhat misunderstood, even by professional flower growers. Exhibitors and judges at St. Louis flower shows often consult the writer about what constitutes a plant of the "succulent" class. Now the writer does not claim to be an established authority but without any semblance of boasting he has acquired sufficient knowledge about succulents, both in the cultivated and wild state, to have an unbiased mind about what should be included in the group. Furthermore, having had direct and long-range contact with growers, commercial dealers, and specialists he has learned what is generally to be recognized as a succulent.

First, it is well to know the origin and meaning of the word "succulent." It is derived from the Latin *succulentus*, meaning juicy, pulpy, and thus is an apt term to describe plants with juicy stems, branches, or leaves. However, we must remember that there are a great many juicy individuals in the plant kingdom which, horticulturally speaking, must be excluded from the

succulent category for a number of reasons. For instance, many of the Begonias possess fleshy stems and leaves but usually they require a great deal of moisture to keep them alive. Also, they are ruled out as succulents because they do not possess the general character of stiffness, spinness, or grotesque elegance usually associated with succulent plants.

A true succulent is a plant which has leaves and stems of greater thickness than the average and which can withstand prolonged periods of drought. Usually the appearance is rigid and sculptured, weird and grotesque, and, to use a modern expression, "strictly out of this world." Succulents generally are exposed for the greater portion of the year to extraordinary dryness. They prefer arid sandy and stony plains, waste rocky plateaus, and crevices of rocks which are almost completely wanting in soil. Succulents are capable of hoarding water from infrequent rains in special storage tissues and rely upon it during periods of need.

One reason why succulents differ from other plants in appearance is that they have developed thickened or fleshy organs so that the transpiring surface would be reduced to a very small area. Plants transpire just like people, and unless they modify their structures to meet abnormal condi-

tions of the deserts the excessive heat and dryness would soon cause the moisture from within to evaporate and the plants would die.

Arbitrarily, succulents can be divided into two classes: thick-leaved and fleshy-stemmed. The former have modified their foliage so that it is unusually fleshy, more or less cylindrical in shape, and often of firm and leathery texture. Good examples can be found in Sedums, Kleinias, Gasterias, and Mesembryanthemums. In the fleshy-stemmed (usually referred to as cactiform) group, best exemplified by cacti, spurges, and stapeliads, the plants have discarded foliage almost entirely or reduced it to a rudimentary state. In this group the greatly thickened and fleshy stems have assumed the function of leaves. It is an established fact that a thickened organ has less surface exposed to the air than a thin flattened one of the same bulk. To make this point clearer, take a small ball of meat or dough about an inch or two in diameter; now roll it out in a flattened cake, and the surface area will have been increased many fold. Thus the plump forms typified in succulents were designed to reduce surface and lessen water loss by evaporation.

The more or less massive stems of succulents, particularly of cacti and leafless candelabrum-like tree spurges, are further rendered grotesque by being ribbed, fluted, or tubercled (warty), which allows for expansion and contraction dur-

ing periods of abundance and want. When water is available the stems become very turgid but when the supply is used up the contraction brings out the ridges and tubercles. Were it not for this accordion-like function, stems of these succulents would burst their skins in hoarding moisture. Leafy succulents are well adapted to the constant swelling and shrinking and they need not be tubercled, nipped, or ribbed as are the fleshy-stemmed kinds.

The storage organs of most succulents are usually a series of cells confined in the interior tissues and are almost hidden by the surrounding vascular bundles. The water in the storage cells is often viscous, mucilaginous, or impregnated with salts, which enables these plants to withstand drought for months. In some succulents, bladder-like cells protrude from the epidermis which sparkle in the sunshine like crystal, conspicuously so in the common Ice Plant (*Cryophytum crystallinum*).

A discussion of the many modifications and exceptions that occur in the various succulent plants would take many pages, but a few of the essential ones have already been mentioned. We are now concerned with facts that will enable us to recognize a succulent and to learn in what plant families they can be found. Give a thought to the following features, and I am sure that the question, "What is a succulent?" can be answered by an affirmative nod or a negative gesture.

1. *High Succulency*.—Any plant that is conspicuously fleshy and that is able to survive dry periods.
2. *Moderate Succulency*.—Any plant with a certain amount of fleshiness in either leaves or stems and possessing several of the following characteristics:
  - a. Member of a family which is known to contain a good proportion of succulent plants.
  - b. Unusual appearance. Either globular or cylindrical, or at least fleshy, this form or condition having been adopted in order to offer the least surface to the sun and to enable the plant to catch, absorb, and retain all the moisture available under abnormal conditions, such as in deserts or in alpine regions where rarefied atmosphere and intense cold are physical handicaps.
  - c. Unusual covering. Plants covered with various protective devices to lessen evaporation. This may be a hard parchment-like epidermis, waxy skin, a layer of wax superimposed upon the skin, white or bluish powder sprinkled over the surface, thick felted hairs, etc.
  - d. Spininess. Plants bearing a conspicuous armor of spines which serve not only to shade the plant body from direct sun but also protect it from browsing animals.
  - e. Grotesque elegance. All plants more or less sculpturally modernistic and with coloration running to pastel shades.
  - f. Rosulate habit. Rosette-shaped plants with leaves packed either closely or loosely on more or less elongated stems.
3. *Low Succulency*.—Any plant that requires the cultural methods of desert plants and that by tradition and long-established usage has been classified as fleshy by collectors.



FIG. 5. Types of xerophytic plants doubtfully succulent but generally classed as succulent: *Yucca*, *Dasylirion*, *Beaucarnea*, *Tillandsia*, and *Testudinaria*.

Succulency is not confined to just one plant family; in fact, there are nearly twenty which boast members of succulent nature. In one or two families the entire membership is succulent; in others it is divided; and in some only a few succulent species are recognized. Too, the succulent flora does not belong to any particular region but is found in all parts of the world, in montane districts, desert wastes, and tropical forests. The plants vary in size from minute *Mesembryanthemums* to tree-like *Euphorbias*, *Cacti*, and *Aloes*. Between these extremes are all the thousands of species and varieties to which belong the weirdly beautiful and fascinating pot plants so prized by succulent fanciers. Following is a brief summary of plant families which contain our best-known succulents:

**CACTACEAE (Cactus Family).**—A very distinct group in the plant kingdom, endemic to the Western Hemisphere but now cultivated or found semi-wild in other parts of the world. Over 1500 species and varieties are recognized in more than 125 genera. All are perennials with simple or branched stems which are more or less fleshy, spiny, cylindrical, globular, or flattened and constricted at intervals. Areoles (cushion-like outgrowths) are the characteristic feature of the family from which branches, flowers, spines, glochids (bundles of fine spines), leaves, hairs or glands originate. Every member of the family is considered succulent, although *Pereskia*, considered to contain the most primitive types, may not be any more succulent than a lemon tree which it superficially

resembles. However, since *Pereskias* belong to the *Cactaceae*, an almost exclusively succulent family, they are given the succulent status. The largest cacti are veritable behemoths with trunks 50-60 feet in height and individual specimens weighing several tons. Others are very tiny, about the size of a thimble or marble.

**EUPHORBIACEAE (Spurge Family).**—One of the largest families of flowering plants, comprising about 250 genera and 4000-6000 species of herbs, shrubs, and trees, with an acrid and often milky sap. Only those which are strikingly cactus-like and which usually inhabit desert regions in various parts of Africa, India, and the Canary Islands are classed as succulent. Most of the succulent spurges are found in the genus *Euphorbia*, but *Monadenium* and *Synadenium* are also wholly succulent. Strangely, succulent *Euphorbiaceae*, which greatly resemble *Cactaceae*, are far removed from that family, but the two have worked out water storage and heat resistance problems practically on the same principles. *Pedilanthus* is the only strictly American genus of *Euphorbiaceae* which is wholly succulent. The flowers of the Spurge family are generally insignificant, without sepals or petals, but sometimes made conspicuous by their number and the colorful bracts which surround the flower-heads. In the entire family only 300-500 species can be classed as succulents.

**ASCLEPIADACEAE (Milkweed Family).**—Another very large family of flowering plants widely distributed from tropical to cold-temperate regions, with over 2000 species. The



succulent members are mostly African and belong to the tribe Stapelieae, which numbers about 400 species in 20 genera. The Stapelieae assume many of the shapes found in Cacti but their texture is usually rather soft and they never attain a very large size. They can be likened to miniature Cactaceae. The flowers of stapeliads are very characteristics, being essentially star-shaped and containing an intricate pollen chamber devised for insect pollination. They are frequently luridly colored and some possess a disagreeable odor like that of rotting flesh, for which reason they are commonly called "Carrion Flowers." The stapeliads include such genera as Stapelia, Carraluma, Duvalia, Hoodia, Hurenia, Tavaresia, Trichocaulon, Stapelianthus, and Edithcolea. Other succulent groups in the family are those belonging to Hoya, Sarcostemma and Ceropegia, which include climbing, twining, or creeping plants.

CRASSULACEAE (Orpine Family). — This family is almost entirely succulent and is widely distributed in temperate and warm regions of the world. It is divided into six tribes, in which are to be found the vast majority of the most popular leafy succulents in cultivation. The best-known genera are Crassula, Rochea, Bryophyllum, Kalanchoe, Adromischus, Cotyledon, Aeonium, Greenovia, Sempervivum, Monanthes, Aichryson, Echeveria, Dudleya, Pachyphytum, and Sedum. The rosulate habit is very pronounced in the Crassulaceae, particularly in Sempervivum, Aeonium, Echeveria, and Dudleya. A most entrancing coloration often characterizes the species of this large family. Roughly, there are over 500 species listed.

AIZOACEAE (Fig-marigold Family). — Unquestionably more of the members of this family are highly succulent, as they chiefly inhabit deserts and sandy seashores and therefore are able to store much water in their leaves. At one time most of the species were included in one genus, Mesembryanthemum, which botanists now have split into more than 100 genera. The "Mesembs" can be subdivided into two classes: stemless and bushy. The stemless include all the "mimic" species (usually reduced to two plump leaves), camouflaging as pebbles, stones, and rocks, among which they grow in South Africa. The bushy kinds are up to two feet in height, or are creepers that carpet sand dunes, rocky places and cliffsides. The Ice Plant is a member of the family of Fig-marigolds.

PORTULACACEAE (Purslane Family). — Most members of this family are classed as succulent, sometimes shrubby, herbs; however, for esthetic reasons some of the weedy kinds, as *Portulaca*

*oleracea*, are ruled out of the category. The common Rose Moss (*Portulaca grandiflora*) and species of *Talinum* and *Calandrinia* are American members of the group. The African *Portulacaria afra* and species of *Anacampseros* are unquestionably the most succulent of the Purslanes.

LILIACEAE (Lily Family). — This is perhaps the most representative family of Monocotyledons, whose members grow from bulbs, corms, root-stocks, or a woody caudex. They are usually of herbaceous habit, although some become woody and tree-like. The succulent species mostly hail from Africa and include such genera as Aloe, Gasteria, Haworthia, Apicra, Bulbine, etc. From a strict standpoint the American genera of Yucca, Hesperaloe, Nolina, Beaucarnea, and Dasylirion are only slightly succulent, yet because they are of xerophytic habit we do not hesitate to call them succulents. Aloes are the most ornamental for outdoor plantings in warm sections, but Haworthias are often considered the "darlings" of all the succulents irrespective of the family to which they belong.

AMARYLLIDACEAE (Amaryllis Family). — Over 800 species are found in this family but only the Agavoids, popularly called "Century Plants," are classed as succulents. These plants grow mostly from rhizomes and bear thick, hard, rigid leaves (sometimes thinner and narrower) frequently close to the ground but occasionally with definite trunks. The leaves of the Agaves and Furcraeas are fibrous and several species are cultivated for the fiber used in the manufacture of rope, cordage, bags, etc. The succulent members are all native of the two Americas while the Aloes, their Lily relatives which they resemble, are distinctly African.

COMPOSITAE (Daisy Family). — This is one of the largest families of flowering plants, embracing about 13,000 species of world-wide distribution. The majority occupy moist to arid habitats but only Othonna, Kleinia, and Senecio can be classified as true succulents. One would never guess their affinity to the Daisies were it not for the typical daisy-like flowers in Othonna and the thistle-like flowers in Kleinia and Senecio. Othonna makes a good ground cover, similar to some species of Sedum, and its leaves look like miniature pickles. In Kleinia are to be found some of the handsomest of succulents. The mottled, pencil-like stems of *K. stapeliiformis* look like sticks of candy.

BROMELIACEAE (Pineapple Family). — This family is of American origin except one species said to have been found in Africa, and it includes both epiphytes and terrestrials to the

number of 1000 or more species. The xerophytic kinds, like the South American Puyas, Dyckias, and Encholirions and the Mexican Hechtias, may well lay claim to inclusion in the succulent category, for they are rigid, spiny, rosette-forming, with a degree of succulency in the leaves akin to Agaves which they somewhat resemble. The same kind of culture is given them as for other succulents.

**GERANIACEAE** (Geranium Family).—Mostly herbs of more or less succulent nature, but because they take considerable watering and do not present a stiff, spiny, grotesque appearance, they must be excluded from the succulent class. However, in *Pelargonium*, there are a few species, as *P. echinatum*, with fleshy caudex armed with persistent spine-like stipules that are definitely succulent. The odd genus, *Sarcocaulon*, is also in the succulent class.

**CUCURBITACEAE** (Melon Family).—Some 800 species are included in this family of chiefly tropical, coarse, herbaceous vines. However, only four or five could be called succulents, and as yet they are not generally available. The genus *Xerosicyos* contains two succulents which promise to become great favorites. They are native to the arid, rocky or sandy localities of Madagascar.

**VITACEAE** (Grape Family).—In this large family of ornamentals are found a number of succulent stem oddities. The most interesting is *Vitis quadrangularis* with peculiar 4-winged stems looking like a spineless *Cereus* of the Cactus family. Several species of *Cissus* produce fleshy bottle-like stems which yearly enlarge their bases and bear at the top fuzzy deciduous fleshy leaves. Specimen plants may be many years old.

**DIOSCORACEAE** (Yam Family).—In this tropical family of twining, slender, herbaceous vines which grow from large solid-fleshy or woody root-stocks there is a curious plant, *Tesudinaria elephantipes*, much prized in succulent collections. The globular rootstocks studded with angular woody protuberances may weigh as high as 100 lbs.

**APOCYNACEAE** (Dogbane Family).—This family contains the remarkable genus, *Pachypodium*, with about 15 species of succulent shrubs, native to Madagascar and South Africa. There is often a succulent cactus-like spiny trunk producing several branches at the top. *Pachypodiums* are curious features of localities where they grow.

**PIPERACEAE** (Pepper Family).—In this family is included the genus *Peperomia*, which contains a large number of tropical herbs of succulent nature. The fleshy leaves of these attractive

plants enable them to endure the dry air of most homes much better than other common house plants. In Mexico a number of *Peperomias* can be found growing in companionship of Cacti and Bromels.

Above I have tried to list those families with the greatest number of succulent species but there are others, for instance, Oxalidaceae and Commelinaceae, which cannot be overlooked. Many new succulents have been introduced in recent years and there is a possibility that several other families contain succulents that will become as popular as those mentioned above.

#### SECRETARY'S REPORT

Now that the election is over and the ballots all counted we find that those elected are:

Dr. Robert T. Craig, *President*, 131 S. Holt, Baldwin Park, California.

Homer G. Rush, *Vice-President*, 820 W. 115 St., Los Angeles, California.

Ethel Rush, *Secretary*, 820 W. 115 St., Los Angeles, California.

George G. Glade, *Treasurer*, 7600 Verdugo Crestline Dr., Tujunga, California.

Those elected to the Executive Board for a four year term are: Dr. E. Yale Dawson, Howard E. Gates, Harry Johnson, Jr.

Due to the vacancies created on the Board by the election of Dr. Craig and Mr. Rush, the Board selected Dr. Lyman Benson to fill the unexpired term of Dr. Craig, and John Akers, to fill the term of Mr. Rush.

#### PERESKIA CLUB, ANTWERP

This club has been erected in 1944 with at first 8 members, all amateurs. In October, 1949, 51 members are listed. Meetings are every month, the first Wednesday, in the Zoological Garden. About 25/35 members assist these meetings. Three exhibitions have been realised: the first in 1945 (rather a private one); the second one in 1946 with about 1000 visitors in one day; the third one in 1948 in a great hall of the Zool. Garden with a duration of 12 days, about 6000 visitors were noted and 1000 plants were exposed. The Society consists up to now only of amateurs and on the monthly meetings after an interesting causerie there is an exchange of small plants (seedlings from the members). The Society has a trimestrial bulletin in Dutch language which has still to be enlarged so that it may become more interesting especially for members who cannot assist in the monthly meetings.

From time to time a visit is made to one of the members who has an interesting collection. Interest in succulents seems to grow since the end of the war.

ALOIS DENGLER

Kerkelei 49, Schilde (Antwerpen).

**PENNSYLVANIA MEMBERS:** Mrs. Edgar Gahney of Myerstown, Pa., wishes to contact a member near her for help in naming her plants. Will Pennsylvania members please help her?

**SUCCULENT PLANTS**—Jacobsen. The revised edition of the most complete book on the other succulents is now available. There are over 300 illustrations with descriptions of 1000 species; mentions as many more in the 293 pages. English edition \$6.50. Special edition \$6.00 (payable \$2 per month for those who are budgeting books). Box 101, Pasadena, California.



FIG. 6. The First Cactus Beds at Lyon & Cobbe's, 1903

All plants in these beds were from Mexico and the Pacific islands on the west coast. The first bed was of the old man (*Cephalocereus senilis*) and the third of *Mammillaria halei*. The tall ones in background, in front of Mr. Branton, were *Pachycereus pringlei* and *Lophocereus schottii*. The lane at the left is now Sunset Blvd.

## SIXTY YEARS AGO

In 1929 Ernest Branton wrote:

More than 40 years ago I had charge of the lath house department of the nurseries of The Germain Fruit Company, at the northwest corner of Fourth and Los Angeles streets. There we had a few cactus, but nearly all were climbers or phyllocactus. There was no unusual interest in this class of plants at that time and no collection of note was known.

On January 1, 1893, I started a ten-acre nursery in the then northwest part of Los Angeles, between the city and the little settlement of Colegrove, now Hollywood, for Lyon & Cobbe. There was no street car service between the two places at that time. The firm for whom I was foreman started at once to specialize in cactus and other succulents, for a boom in these plants, the world over, was just beginning to assert itself. We had three collectors in Mexico, headed by the late C. R. Orcutt, of San Diego, and our first arrivals were from the mainland and Guadalupe, Cocos, Marguerita and other islands off the west coast, so that we soon had a large stock of species never before offered the public.

We bought heavily of McDowell of Mexico, Mrs. Nickels and Mrs. Bright of Texas, and of

many in Arizona and other states. Whenever I could get away, I collected in California, being on trips for two weeks at a time and collecting many thousands. We bought many from A. H. Alverson, of San Bernardino, and from ranchers and ranch boys in all western states. Soon we had large fields and two large lath houses full, comprising the largest commercial stock of cactus the world had ever seen and I do not know of its equal today. There were private collections having several times the number of species, especially in Germany, but we had many carloads sent in of nothing but cactus, coming from every district in North America and Mexico where cactus were natives. Some of the species I have never seen since.

The prettiest species coming to me was *Echinocactus trollietii* and I do not know of one now. Ours went to the Royal Botanic Gardens, Kew, England, as did the best of everything we had. One plant of *Echinocereus mojavensis* contained 236 heads on one root, so claimed Orcutt, the collector, and was sold to Kew for \$100. They paid equally high prices for many fine specimens, prices which in those days were positively

staggering to private owners. Our best customer was Haage & Schmidt, of Germany, though several German firms bought of us, as did others in England, Italy, France, and elsewhere. Several lesser dealers were established in Los Angeles but purchased nearly all of their stock of Lyon & Cobbe. The best private collection that I recall was that of Alec LaBonge, a barber of North Main Street, living on Ducommun Street. One of our best customers was A. S. White, who gave White Park to Riverside, where such a fine collection was maintained for many years.

We had a cactus magazine published in Baltimore, by the cactus club of that city, known as the Baltimore Cactus Journal, to which I was a regular contributor. When our local cactus club started a year ago, and before we had the present Journal, I gave to Mr. Frick, for the club, all the half-tone engravings I had, several of which have been used in the Journal. I also loaned him a bound copy of the Baltimore Cactus Journal, and from the latter, without explanatory note, was reprinted the article on "Soils" which our

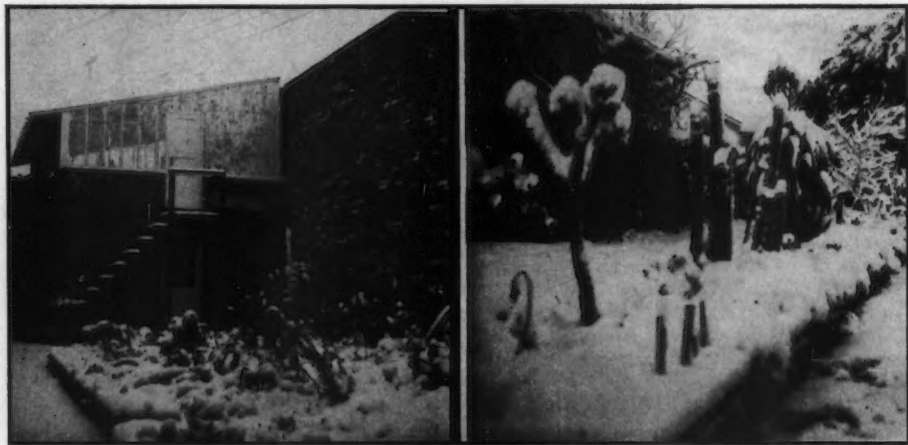
friend Ned Lawrence lands on so effectively with both feet.

We also had the Florist and Gardener, of Chattanooga, Tennessee, that specialized in literature cactaceous. They took photographs of a local collection in pots, a row at a time, published the illustrations and offered a prize for the one who could name the greatest number of them and published the winner's descriptions. I remembered I "copped" the prize and still have the magazine in which it was announced and the descriptions printed.

It is with extreme regret that we announce the death of F. Radley of Oakland, California. His commercial garden is known as Stanislaus Desert Gardens. His many trips to Mexico made him many friends and we will miss hearing him tell about the interesting plants that he saw on the last trip.

#### SECRETARY WANTED

Your Editor has an opening for an experienced stenographer. Preference will be given to one with knowledge of German or who has an interest in botany. Scott Haselton, Box 101, Pasadena, California.



#### SOUTHERN CALIFORNIA 1949

FIG. 7. Supreme sacrifice for science. The above shows an unimposed experiment in your editor's garden: (LEFT) Experimental gardens at his office for photographing plants: (RIGHT) Parkway planting 6x130 feet at his residence in Pasadena. The first of the year, after a delightful rain, came an unusual series of cold nights registering 32° F. to 20° F. Pots and plants froze and some remained frozen for three days. California sunshine then broke through the black cloud bank caused from the smudge pots and Echeveria flowers and the more tender cacti began to hang their heads with shame. This was not enough, so more rain turned to a flurry of snow and on the morning of January 11 outdoor cactus growers experienced the thrill of seeing their entire collection mantled with four inches of nice warm snow. Rain, hail storms and two nights of lashing winds are being expedient while waiting the prediction "more frost." Letters of sympathy have been pouring in and perhaps Mr. Wiegand is right, "Move your collections to New Jersey where they can be properly cared for." Seriously, we can learn from this experience what plants are hardy and we hope that growers will make careful notes and report in the next JOURNAL.

*The following four pages are the 7th Installment of the "Bluhende Kakteen Reprint." The center four pages are the Index for last year's Vol. XX of this JOURNAL; this should be removed and assembled with last year's issues.*



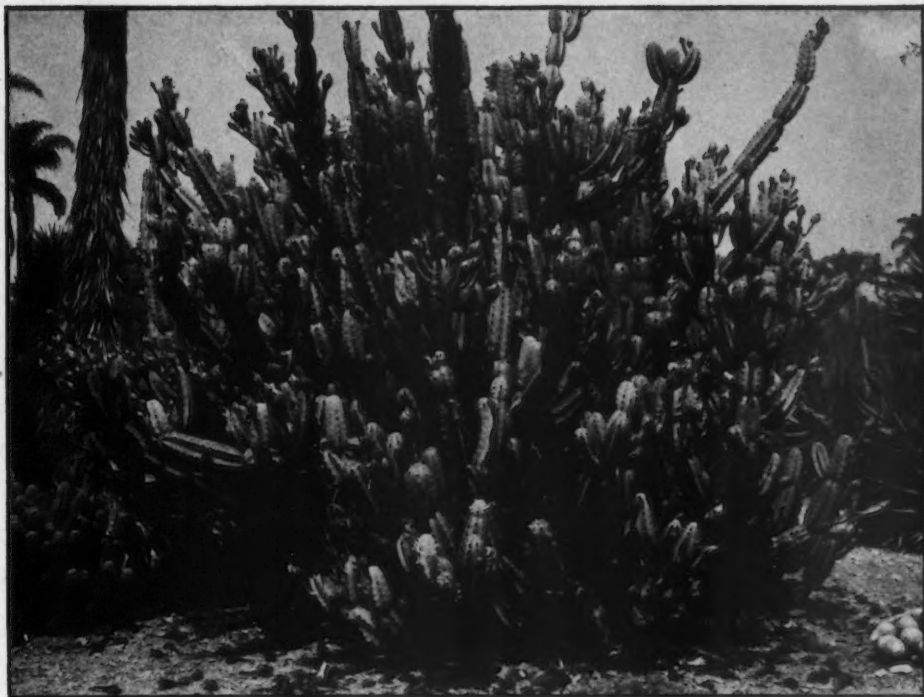


FIG. 8. Mature plant showing habit of growth of *Cereus Huntingtonianus*.

## OBSERVATIONS ON THE GENUS *CEREUS*

By WILLIAM HERTRICH

Curator Emeritus Huntington Botanical Gardens

In a catalogue of the A. Blanc Co., Philadelphia, Pennsylvania (displaying two engravings dated 1890), there is described and illustrated a new cereus imported from Brazil by the late Frank Weinberg. It was named *Cereus Childsii*, by Mr. Blanc in honor of John Lewis Childs of Floral Park, N. Y.

In the August, 1929, issue of *Desert Plant Life*, Vol. 1, p. 45, E. C. Rost illustrated and commented on *Cereus Childsii*. The plant that he held in question at that time, however, was an entirely different species from the one Blanc described as *C. Childsii*. Sensing an error, I traced the original source of the plants mentioned by Rose, of which the Huntington Gardens had several fine specimens. The largest plant found in Southern California was growing at White Park in Riverside. From this plant many cuttings had been taken and distributed to

various collections.

It was about 1889 that Mr. Franz Hosp, a well known horticulturist and landscape gardener of Riverside, California, had assembled the collection of cacti in White Park, part of which is still maintained. In conversation with Mr. Hosp I understood him to mention having imported some cactus plants from Haag and Schmidt in Erfurth, Germany. This importation included several species of *Cereus* among which was one erroneously called *C. Childsii* by E. C. Rost. Pursuing the matter further, I corresponded with Mr. Friedrich Weingart, an authority on the genus *Cereus*, forwarding to him full descriptions of the plant in question, with photographs and fruit of the plant. I also inquired of Mr. Weingart whether he had any information, or possibly plants, of this *C. Childsii* as described by Blanc.



FIG. 9

*Cereus validus* (R 20,094) showing habit of growth and closeup of main and side branch, also mature fruit.

Following this correspondence, Mr. Weingart wrote in some detail in the July, 1932, number of *Monatsschrift der Deutschen Kakteen Gesellschaft*, (vol. 39, pp. 144, 145) about the origin and distribution in Europe of *C. Childsii*. In the same volume (pp. 165-168) he then described a second plant as a new species under the name, *Cereus Huntingtonianus*\*, basing his description on information received from the Huntington Botanical Gardens. A copy of this description sent to Mr. Weingart was published in the *Journal of the Cactus and Succulent Society of America* (vol. 4, pg. 374-375) in conjunction with a copy of the description of *C. Childsii* by Blanc from his 1890 Catalogue, Item No. 375.

Subsequent to these occurrences Mr. Weingart sent to the Huntington Botanical Gardens a small plant of *C. Childsii*—supposedly a cutting

of the original importation from Blanc—which he had received from DeLaet of Antwerp. It arrived in good condition and has since been propagated by grafting and cuttings. This plant flowered for the first time last year, (i.e. 1948). It does not correspond in detail with *C. Childsii* as illustrated and described by Blanc in his catalogue, nor with the plant illustrated and commented upon by Rost in the *Desert Plant Life Magazine* (vol. 1, p. 45).

Having established the error in the name of the plant which had been masquerading in Southern California as *C. Childsii*, and having traced it to its source at Riverside, California, I decided to pursue the matter further in 1936, when I went on a trip to Europe. I searched through the various Botanical Gardens for both *C. Childsii* and *C. Huntingtonianus* with no success. However, in the Botanical Garden at Berlin-Dahlem, I found two plants closely related to *C. Huntingtonianus*, namely *C. Forbesii* and *C. Labouretianus*, represented to me as type material which had never flowered. The Cura-

\*EDITOR'S NOTE: For additional illustrations see *Journal* Vol. IV, pgs. 369, 375. Also an illustration in color in the booklet "A Guide to the Desert Plant Collection" by Mr. Hertrich.



FIG. 10. *Cereus Forbesii*—Habit of growth. Young plant grown from cutting obtained from Botanical Garden, Berlin-Dahlem, 1936.

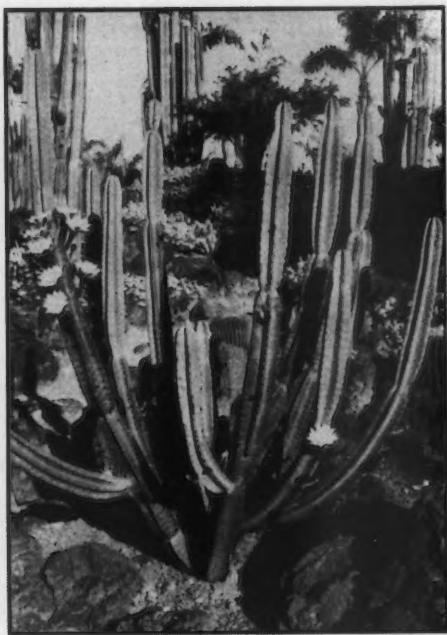


FIG. 11. *Cereus tetragonus*—Habit of growth and flowering branches.



FIG. 12. *Cereus Huntingtonianus*—Young plant grown from cutting.

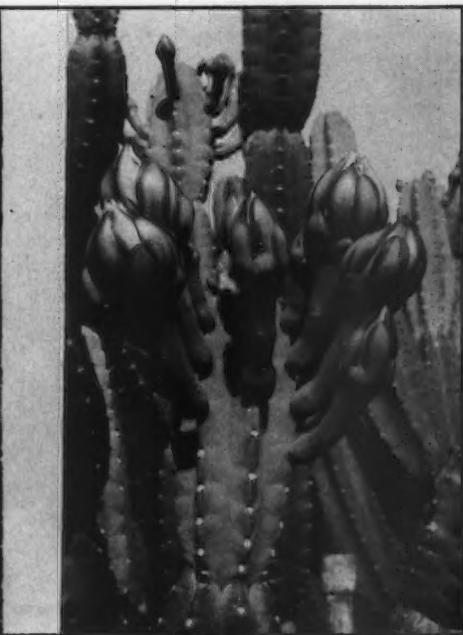


FIG. 13. *Cereus Huntingtonianus*—Close-up of main and side branches, also flower buds.

tor of this Botanical Garden, Dr. Erich Werdermann, was good enough to let me have a cutting of each, and since that time these have grown to flowering size and have produced fruit the past two years (i.e. 1947, 1948).

*C. Forbesii*, Otto, described in Foster's *Cactus Handbook*, 1846 (p. 398), and *Piptanthocereus Labouretianus*, Riccobono, Boll. R. Ort. Bot. Palermo, 8:231, 1909, are included in the synonymy of *Cereus validus* by Britton and Rose in *Cactaceae*, vol. 2, p. 7. In the Huntington Botanical Gardens, there is growing a specimen of *C. validus* (our No. 3-69) which was received into the garden from the Rose collection (their No. R 20,094) established in Washington, D. C. *C. validus*, as described in *Cactaceae* (Britton and Rose, vol. 2, p. 7), and *C. Hankenianus*, illustrated and described in *Blühende Kakteen*, vol. 2, t. 114, included in the synonymy above, are in no way identical with the *C. Forbesii* or with *C. Labouretianus*, now both growing in the Huntington Botanical Garden. However, *C. Forbesii* and *C. Labouretianus* are closely related to *C. Huntingtonianus*; and in conjunction with *C. tetragonus*, Miller, and possibly one or two others—an unnamed specimen of which I saw in fruit at the Royal Botanic Gardens at Kew—these particular plants form a group in the genus *Cereus* which produces characteristically a pulp of a ruby red color.

*C. Huntingtonianus*, *C. Forbesii* and *C. Labouretianus* have apparently identical flowers, more cup-shaped than funnel-shaped; and the perianth segments are of similar shape and color shading, as reported in the description of *C. Huntingtonianus*.

The fruit of all three species (if they are separate species which is questionable) are of similar size and shape and alike in other characteristics. All behave in much the same manner—viz. remaining unbroken on the stem, shriveling and separating in age. The splitting of the skins of the fruit to expose pulp and seed, as occurs in most species of this genus, is very rarely seen in any of the three species mentioned above, and if it does so at all it occurs on an over-sized fruit. The seeds of the three above species are considerably smaller and of a different shape than seed of *C. validus*.

The flowers and fruit of *C. tetragonus* correspond with the above three species mentioned except that they are only a miniature form thereof. In habit of growth, length and shape of joints, spine arrangement, *C. Labouretianus* varies considerably from *C. Huntingtonianus*;



FIG. 14. Large flowers are *Cereus Huntingtonianus*.  
Small flowers are *Cereus tetragonus*.

though to a lesser degree of variation in *C. Forbesii*. The number of ribs on the three species vary somewhat within the plant, and range from 5 to 8, being least compressed on *C. Huntingtonianus* and most on *C. Forbesii*.

The above data indicates clearly the close relationship between *C. Huntingtonianus*, *C. Labouretianus* and *C. Forbesii*, as well as indicating the disassociation of *C. Forbesii*, Otto and *C. Labouretianus*, Riccobono (received from the Botanical Gardens at Dahlem), from the synonymy of *C. validus*. As for *C. Childsii* described by Blanc, the plants now growing in our Botanical Garden from a specimen received from Mr. Weingart, do not correspond with the original description in Blanc's catalogue; as a matter of fact the writer has yet to see a species of the genus *Cereus*, producing flowers with 140 petals as indicated in the description. Flowers with half as many petals are considered numerous in that genus.

EDITOR'S NOTE: Mr. R. B. Townsend, Superintendent of Huntington Botanical Gardens, has an opening for a qualified man with experience in desert plants. Send your qualifications to the above named at San Marino 15, California.





FIG. 15

*Cereus Labouretianus*—Habit of growth in young plant grown from cutting obtained from Botanical Gardens at Berlin-Dahlem, 1936.

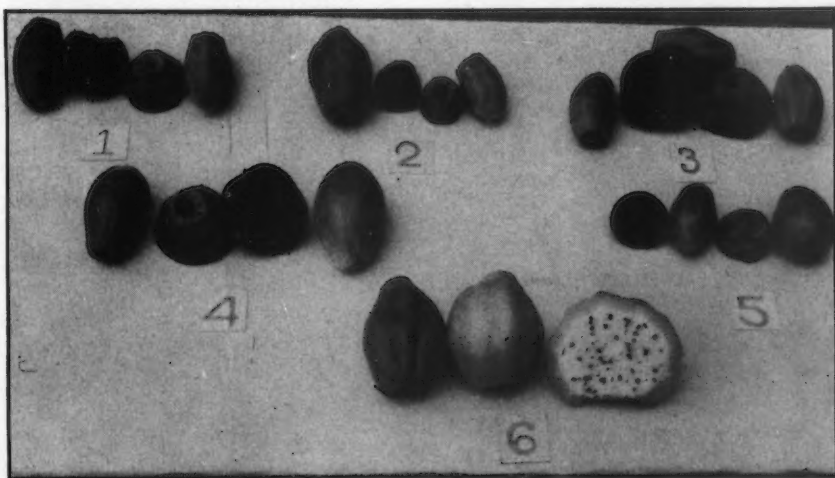


FIG. 16

Comparison of fruit: No. 1. *Cereus Labouretianus*; No. 2. *C. Forbesii*; No. 3. *C. Huntingtonianus*; No. 4. *C. Huntingtonianus* seedling; No. 5. *C. tetragonus*; No. 6. *C. validus* (R 20,094).

## COMPARISON OF GROWTH

|                 | <i>C. validus</i>        | <i>C. Forbesii</i>                     | <i>C. Labouretianus</i>                | <i>C. Huntingtonianus</i>                        |
|-----------------|--------------------------|--|--|--|
| Branches        | upright, open            | spreading                              | spreading                              | spreading  |
| Branching       | at base and re-branching | at base and re-branching               | at base and re-branching               | at base and re-branching                         |
| Height          | 3 meters or more         | approx. 3 meters                       | approx. 3 meters                       | 2 to 3 meters                                    |
| Young Growth    | glaucous                 | bluish-gray                            | bluish-gray                            | bluish-gray                                      |
| Mature Growth   | gray-green               | grayish                                | grayish                                | grayish  |
| Young limbs     | up to 30 cm. diam.       | up to 25 cm. diam.                     | up to 25 cm. diam.                     | up to 25 cm. diam.                               |
| Seasonal Joints | up to 50 cm. long        | up to 30 cm. long                      | up to 30 cm. long                      | up to 30 cm. long                                |
| Ribs            | 4 to 8                   | 5 to 7                                 | 5 to 7                                 | 5 to 7   |
| Height Shape    | about 5 cm. compressed   | about 3 cm. compressed in young growth | about 3 cm. compressed in young growth | about 2½ cm. slightly compressed in young growth |
| Areoles         | about 3 cm. apart        | about 3 cm. apart                      | about 3 cm. apart                      | 2-3 cm. apart                                    |
| Spines          | moderate stout           | very stout                             | stout                                  | stout  |
| Rad. Spines     | 5: ½ to 2 cm. long       | 5 to 6: 1 to 4 cm. long                | 4 to 5: 1 to 2½ long                   | 3 to 4: ½ to 1 ½ cm. long                        |
| Cent. Spines    | 2 to 4: 2 to 5 cm. long  | 3 to 4: 3 to 6 cm. long                | 1 to 2: 3 to 6 cm. long                | 1 or more: up to 10 cm. long                     |

## COMPARISON OF FLOWERS

|                   |  |  |  |   |
|-------------------|--|--|--|---|
| Length            | 22 cm.                                     | 18 cm.   | 17 cm.   | 18 cm.                                    |
| Broad (open)      | 18 cm.                                     | 15 cm.   | 15 cm.   | 16 cm.                                    |
| Shape             | funnel                                     | cup shape                                      | cup shape                                      | cup shape                                 |
| Ovary             | dark green                                 | dark gray-green                                | dark olive green                               | light olive green                         |
| Surface           | knobbed                                    | smooth   | smooth   | smooth, rarely ribbed                     |
| Bracts            | about 10-yellowish; elevated and elongated | very few; short; triangular                    | few: short triangular                          | few; short triangular                     |
| Tube              | 11 cm. long<br>16 to 17 mm. in diameter    | 9 cm. long; smooth<br>17 to 19 mm. in diameter | 9 cm. long; smooth<br>17 to 19 mm. in diameter | 10 cm. long; smooth<br>17 to 22 mm. diam. |
| Perianth Segments |  |  |  |   |
| Outer             | about 54 reddish                           | about 31 dark rose                             | about 31 dark rose                             | about 33 dark rose                        |
| Middle            | tips light pink                            | tips rose pink                                 | tips rose pink                                 | tips rose pink                            |
| Inner             | white                                      | white  | white  | white                                     |
| Stamens           | white                                      | cream  | cream  | cream                                     |
| Style             | yellowish-green                            | cream  | cream  | cream                                     |
| Stigma lobes      | about 16 yellowish-white                   | about 19 dark cream                            | about 17 dark cream                            | about 19 dark cream                       |

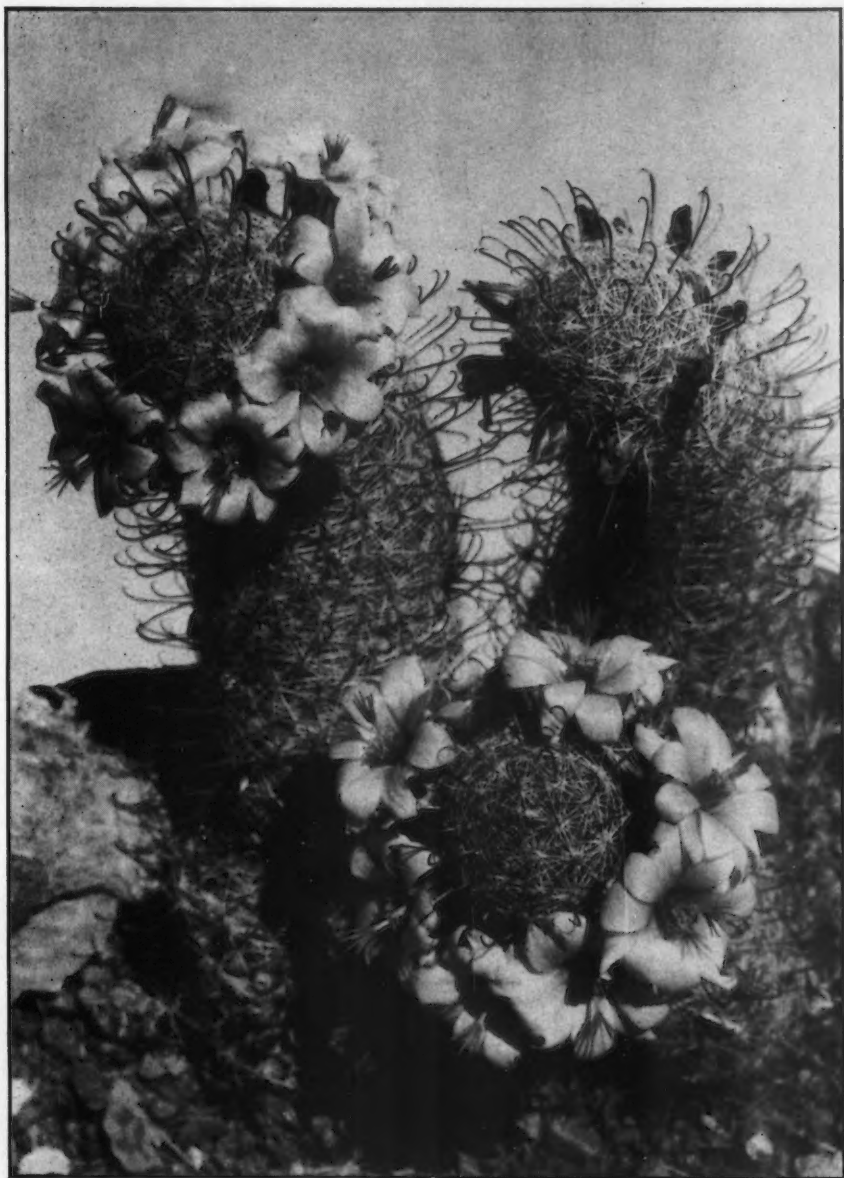
## COMPARISON OF FRUIT

|           |                                   |                                  |                                  |                                  |
|-----------|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Length    | 7 to 8 cm.                        | 5 to 6 cm.                       | 5 to 6 cm.                       | 5 to 6 cm.                       |
| Diameter  | 5 to 7 cm.                        | 3 to 4 cm.                       | 3 to 4 cm.                       | 3 to 4 cm.                       |
| Shape     | ovoid to globular                 | oblong to ovoid                  | oblong to ovoid                  | oblong to ovoid                  |
| Skin      | light orange-yellow, fully mature | brownish green, turning purplish | brownish green, turning purplish | brownish green, turning purplish |
| Thickness | 4 mm.                             | 8 mm.                            | 8 mm.                            | 8 mm.                            |
| Pulp      | white                             | ruby red                         | ruby red                         | ruby red                         |

\*NOTE: Some of the dimensions given vary slightly on different plants as within the same plants, depending often on cultural conditions, type of soil, exposure, or number of flowers or fruit to a branch.

## COMPARISON OF SEED

|         |                         |                          |                          |                          |
|---------|-------------------------|--------------------------|--------------------------|--------------------------|
| Color   | dull black              | dull black               | dull black               | dull black               |
| Shape   | kidney                  | partly kidney, plus neck | partly kidney, plus neck | partly kidney, plus neck |
| Helium  | large, white, depressed | small, depressed         | small, depressed         | small, depressed         |
| Surface | densely indented        | densely knobbed          | densely knobbed          | densely knobbed          |
| Size    | 3 x 1½ mm.              | 1¾ x 1¼ mm.              | 1¾ x 1¼ mm.              | 1¾ x 1¼ mm.              |



### ARIZONA CACTI

No. 1 of a series by R. C. PROCTOR, Phoenix, Arizona.

FIG. 17. *Mammillaria microcarpa* Engelm., is not only found in Arizona but has a wide distribution: California to Texas; Sonora and Chihuahua, Mexico. The type locality is along the Gila River, Arizona, 3000-4000 feet elevation. The plant grows to 16 cm. high and is practically hidden by radial spines. Flowers are about  $2\frac{1}{2}$  cm. long, pink with darker mid-stripe and very pale margins.



FIG. 18. Scott Haselton stands between the living and the dead Sahuaros. The *Carnegiea gigantea* on the left is badly scarred by fire. The skeletons of dead plants are used to make furniture. Photo by Mr. Earle in the Desert Botanical Garden, Papago Park, Arizona.

## MEN WHO MAKE SPINE

By LADISLAUS CUTAK

Mr. Haselton has no actual hand in "Spine," but his is the spirit of publicity for Succulent Plants, and thus he is the man behind the men who make "Spine." Without Haselton there would be no Cactus Culture, as we know it today.—Lex Fuaux, Editor.

It is said "the pen is mightier than the sword"—and how true this is! Propaganda can do more for an espoused cause than might. In the past 20 years, propaganda of extremely good quality has skyrocketed cacti and kindred succulent plants to a prominence never achieved be-



fore. A man who has played an important role in furthering popularity in these pet plants of ours is none other than *Scott Haselton*, of Pasadena, California. Ever since 1929, when he established the Abbey Garden Press as a hobby, he has been editing the *Cactus Journal* of the Cactus and Succulent Society of America, a clearing house for earnest writers. No popular cactus magazine has ever lived as long as the *Journal* or maintained its scientific leadership. For the records, I might add that the *Journal* has never been self-supporting in itself, and, if it had not been for Haselton's books and real estate deals, he could not have carried it all these years. All of us owe a lot to Mr. Haselton for maintaining such a high-quality magazine, whose only profit has been enjoying a service to cactophiles.

When Britton and Rose published their monumental work on the *Cactaceae*, it was this work more than any other that really blazed the trail for the popularity of cacti in the English-speaking world; but there is this possibility: That there would have been no cactus interest in America strong enough to carry through two depressions and a war if it had not been for the *Journal*. When the *Journal* was started there was only *Kakteenkunde* and a few German books in existence, with a few others printed in French. The *Journal* led the way to other books and magazines printed in English. The *Journal* also found Messrs. White and Sloane and brought them together. Without the *Journal* there would have been no *Mammillaria* book, J. R. Brown's published works, or a great many others that were published by other presses. Yes, the pen is mightier than the sword!

Scott Haselton is one of the most affable and likeable fellows that I know. There is a boyish charm about him that is hard to beat. Very seldom does he talk about himself, and it is extremely hard, even for his most intimate friends, to learn of his private affairs. Once I made a three-day plant hunting trip with him, and you wouldn't want a better companion. It is on trips like these that men get to know each other, and reveal the stuff they're made of. Born in Vermont, he possesses a sense of humour that is akin to a New Englander—a kind of dry fun that is penetrating and hits the spot where and when needed. He is not only a plant enthusiast, but a man of many accomplishments. He has a lovely collection of succulents at his Altadena home, growing most of them in the front yard garden, where passersby can evaluate their possibilities in outdoor plantings.

Scott is an excellent photographer, and he has a particular yen for shooting fences and old homesteads. He also likes to rummage through trash piles at abandoned desert homesites for possible clues to the identity of former owners. But perhaps I gave a secret away! He does really enjoy the printing trade, to get back to this phase of his life. His Abbey Garden Press has gained an enviable reputation as the only concern publishing and distributing cactus and succulent books exclusively. During the past twenty years he has published 30 cactus and succulent books, besides nearly 250 issues of the "*Cactus Journal*," and more than 75,000 single volumes have been distributed along with a quarter million pamphlets. Yes, this speaks well for Scott Haselton.



FIG. 19. Scott Haselton cooking the easy way on a desert trip conducted for Lad Cutak with Gil. Tegelberg, Bill Marshall and Lad Cutak (in right foreground).

## A NATURALIST'S DIARY ON THE MEXICAN WEST COAST

By E. YALE DAWSON

### PART III

*Saturday, November 9—Cabeza Ballena, Baja California*

We've been out of La Paz for more than a week now and our collecting gear has been constantly in use the whole time. We have traveled little distance and have spent all of the days exploring the natural history of this remarkable region. The entire Cape District is in flower, and the whole of Nature seems at a peak of activity.

Our first night out brought us to camp in a heavy oak forest in the hills near Triunfo, a locality where insects and reptiles were abundant, and the cool mountain breezes among the most refreshing of the trip thus far. At San Bartolo a little farther on we found the nearest thing to a tropical jungle on the Baja California peninsula, for the canyon is deep, narrow and shaded, and vine-covered trees are tall amid the palms. The strange *Ficus Palmeri* grows on granite cliffs bordering the arroyo and sends its broad, taffy-like roots down the rocks like a frozen waterfall.

At Buena Vista, as we came out on the beach, the riotous brilliance of the scarlet coral-vines covering the ground and climbing over the golden bush-composites would put a technicolor movie to shame.

Beyond San Jose del Cabo lies a rich marine area of intertidal reefs, an area in which marine plants have never before been collected,—untouched, virgin ground for the naturalist. We met the tide as it ebbed and spent three hours wading through the pools filled with sponges, corals, tropical fish, and an exciting abundance of algae. We found such exceptional novelties there at Punta Palmilla, that we have returned today to a reef nearby to continue the work in this area.

Friday we made the trip to Cabo San Lucas and took the trail out the peninsula to the western beach. It turned into quite a rock-climbing trip, over precipitous granite cliffs dropping almost sheerly into a turbulent sea. On the protected east side the little beaches between the towering white rocks are spectacular beyond words, with great sea-stacks standing off, topped by fishing cormorants and pelicans, deep-green pools filled with sea fans and huge colored fish,—and the immense sea, to the south 2500 miles to Easter Island, to the west 2000 miles to Oahu.

The cacti have been less spectacular than in the northern deserts, but none the less abundant. Here they grow amid such a relative luxuriance of other plants that they lose their prominence, and at this leafy season one must usually look sharply to see many of the smaller ones. At San Lucas we found representatives of most of the species of the southern "cape district" easily accessible within a limited area. *Lemaireocereus Thurberi*, *Pachycereus pectin-aboriginum*, and *Lophocereus australis* are everywhere abundant along with *Mammillaria armillata*, *Bartschella Schumannii* and *Ferocactus Townsendianus*. *Lemaireocereus littoralis*, that peculiar species so suggestive of a dwarf *L. Thurberi*, is frequent along the seaward side of the hills with *Echinocereus sciurus*, and *Mammillaria peninsularis* grows on the granite hills of Cabo San Lucas itself.

*Monday, November 11—  
La Paz, Baja California*

Again the sybaritic life, if only for a day. It suits us well after our not-too-comfortable periods in the field. Particularly, the night before last our slumbers were not so deep as they promise tonight. We were in San Jose del Cabo, the truck in a garage with a broken brake-shoe, and we in a "hotel" to avoid an anticipated rain. Our quarters were on the second floor, in the dark, for the city's generator had just gone dead. The toilet was said to be inconveniently located downstairs in a dark corner, so the proprietor brought us a bucket and a pitcher of water; in the dark we didn't notice that the bucket had a hole in it. After acquiring a puddle on the already muddy floor (it had been sprinkled to lay the dust) we put the bucket in the wash basin and prepared for the ordeal of a Mexican bed. In due time we became tolerably comfortable, but one of the other guests had begun to sing; when the singing was finished after an hour all was quiet and we got to sleep just in time to be awakened sharply by all the lights in the hotel and the town coming on at once,—the generator! Shortly after midnight the dogs of the town began their night's howling and barking, and hardly had they finished before it was time for the roosters to announce the arrival of dawn. A brief interlude between the latter two noises had been filled by the moving of a piano down the narrow, rickety stairs. Though the fleas and mosquitos had been

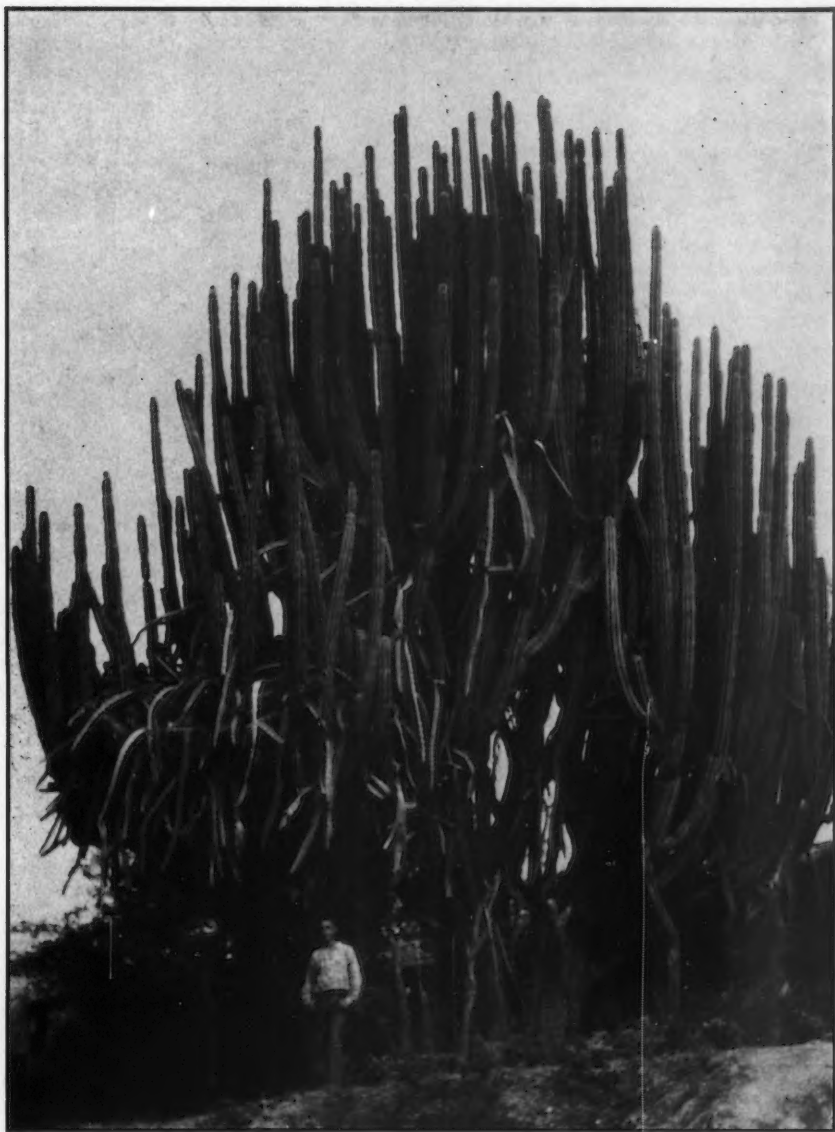


FIG. 20

*Lemaireocereus queretaroensis* draped with *Hylocereus tricostatus* near Union de Tula, Jalisco.

moderately considerate, we were by morning quite thoroughly tired out, but as we left the proprietor greeted us cheerily with: "Did you sleep well?" It had not rained.

Now, our problem in La Paz has been to get transportation for the truck across the Gulf of California. Two weeks ago we were told that the chances were very slight within the month.

This morning we were dismayed to learn that the only available ship was in for repair and no automobiles would be transported until January. Unable to accept this devastating pronouncement as final, I continued my inquiries until by persistent questioning I was rewarded by a rumor that the *Mazatlan*, an old Mexican Army auxiliary training and transport ship, is

perhaps to sail tomorrow. I have just now come from the Army headquarters and have arranged with the military chiefs to have the truck accepted as cargo to Guaymas.

Thursday, November 14—

Tuesday morning we were down at the dock at 7 A.M. in accord with our instructions from the Army. Of course nothing happened until 8, but at that time we proceeded through the Aduana and shortly afterward the loading crew began to rig the dock for the embarkation of the truck. Twenty-three men were employed by the union to handle a few planks and ropes and to make motions for me as I drove off the dock. I had paid a surprisingly high price of 45 pesos to the local union for the dock work and we were all but ready to cast off when another union presented a bill for the work from the edge of the dock to the ship! That was 55 pesos more.

The truck was precariously perched on two planks crosswise of the ship and just forward of the pilot house. The beam of the ship scarcely exceeded the wheel-base of the truck and the front bumper and rear spare hung overboard respectively to port and starboard. We prayed for calm weather all the way across, for we had been duly assured upon accepting this agreement that in event of foul weather it would be impossible to keep the truck on shipboard. It would have to be jetisoned. When the engine broke down in mid Gulf and we began to wallow, we harbored grave misgivings for our expedition, but the damage was soon repaired and the weather continued warm and quiet. In response to the total lack of accommodations for our personal use we lived as best we could during the two day crossing in the truck, which, however, was in constant agitation from being climbed over by the 48 officers and men of the ship on their ways to and from the showers, toilets and washroom in the bow.

Scarcely having arrived in Guaymas we were dismayed at the discovery of a worn wheel bearing in the truck. Again we are stalled and must await a replacement. This country is not without interest, though, and much can be done with the time. San Carlos Bay just a few miles northwest is a wonderful place: good tide pools for algae, plenty of lizard collecting country, cacti all around, and even *Euphorbia ceroderma* for a bit of spice among the succulents. I want to look again for the big python I found over there in February. Perhaps I can catch him this time.

Friday, November 29—Los Mochis, Sinaloa

At long last the air express delivered our wheel bearing and we were able by mid-afternoon to install it and prepare to leave Guaymas which had become all too familiar to us. We

could hardly have left sooner, for only today has Maxine felt strong enough to travel again after recovering from a severe intestinal infection.

The roads south of Guaymas are poor,—rough, bumpy and slow. We made only thirty miles by evening and camped in a forest of *Lemaireocereus* under a dewy sky which turned cold by morning.

Today the driving has been better. From Ciudad Obregon, which seems to be a very clean, progressive agricultural town, the roads are well graded to Navajoa and to Los Mochis via Agiabampo, and except for a complete absence of road signs which more than once caused us to retrace our course, we made fair time in a reasonably comfortable way. We had expected the Rio Fuerte to be a barrier, but found it provided with a very adequate pango ferry.

The vegetation is dry at this season here in Sonora and northern Sinaloa, and although the cacti are still robust and apparently well-watered, the leaves are nearly gone from the spiny shrubs and trees. *Pachycereus pectin-aboriginum* and *Lemaireocereus Thurberi* frequently form open forests, the latter of very large plants. *Rathbunia alamosensis* and *Ferocactus Wislizeni* are frequent and a *Nopalea* is beginning to show up along with occasional mammillarias of several sorts. Otherwise the vegetation is of a uniform high, thorn-brush which has already become rather monotonous along the coastal plain. We haven't been near any mountains, for we avoided the Alamos road which was said to be rough and rocky. Cara-cara hawks are the dominant animal life, ever visible on the tops of the giant cacti. We saw one roosting area where we could have counted over a hundred.

To be continued

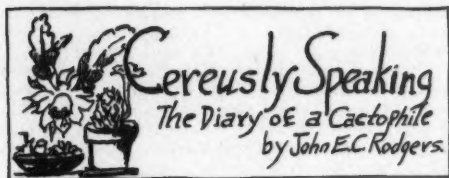
Dear Mr. Haselton:

I feel that I should have at least thanked you for the continued excellence of the JOURNAL. You as editor, must sometimes be discouraged, and I feel that an occasional word of appreciation, from your readers must be acceptable. I can well understand how difficult it must be, at times, to find something to publish which has not been covered very adequately, in one of your many previous JOURNALS. May I point out that the monthly magazine which you produce, has one very fine point, its illustrations. Though I have grown Cacti and Succulents for many years, I always get a thrill when I see a good photograph of a plant that I have never seen before, and I would say for the hundreds like me, that as long as you can put plenty of pictures in the JOURNAL, then your public is getting just what it wants.

C. R. H. England

DESERT PARADE—Carr. Postpaid \$2.75. A guide to Southwestern wild life and some of the desert plants. Know the mammals, birds, snakes and lizards that you see associated with desert cacti. Well illustrated with 72 photos. Box 101, Pasadena, Calif.





The genus *Kleinia* belongs to the Compositae or Daisy Family. The plants of this genus are cousins to the sunflowers, daisies, thistles, and dandelions but differ from their cousins in containing both shrubby and vining types. E. J. Alexander in *Succulent Plants of the New and Old World Deserts* says, "Practically all of the succulent composites are in the four closely related genera — *Senecio*, *Kleinia*, *Notonia*, and *Otbonna*—in the tribe Senecionidae. In all of them both stems and leaves (when leaves are present) are succulent and all have small thistle-like flower-heads of white, cream, yellow, red, or purple florets in which there are no rays."

Catalogues list from 9 to 16 species that are available at present. The most common ones in this locality are *K. articulata*, *K. pendula* (*Notonia pendula*), *K. radicans*, *K. repens*, *K. stapeliiformis*\*, and *K. tomentosa*. *K. articulata* is called Candle Plant by dealers and collectors. *K. pendula* is dubbed Snake Cactus and Inch Worm or Pot of Worms. *K. radicans* gets the same name as *Otbonna crassifolia*—Little Pickles. Most of the others are so new in collections they haven't become familiarized or nick-named.

The blooming time for my *Kleinias* is during our late fall and winter which is natural, as *Kleinias* are found in Arabia and S. Africa; our fall and winter corresponds to their spring and summer below the equator.

Since most of the *Kleinias* are as a rule "non-discouraging" additions to any collection I should advise most collectors to have more than a passing interest in them. I have encountered few diseases, insects, or fungi that bother them. *Kleinia radicans* and *K. articulata* develop rot which can wipe out all of our well-planned efforts to grow them. However, a small piece in good health can renew within a year the deceased species' former luxuriance. Too much moisture in a too heavy soil is usually found to be the cause of rot. Nematodes are also a pest in the thick roots of this genus. The species strike root so easily that cuttings may be trimmed back to healthy tissue and put in the rooting box of sand or Vermiculite.

Because of their native habitat being in dry South Africa and Arabia we must realize that a loose soil rich in humus and kept on the dry side is best. I'm always experimenting so I keep my *Kleinias* in pots which border on the small size. This keeps them always using up my over-indulgent waterings in the winter. It also keeps the shrubby growers and vines within my space limits. Yes, I do have a space limit—but don't offer me any new ones! There are limits and "limits."

A loose well-drained soil is best for all of the plants I own. It should contain old plaster, air-slaked lime and charcoal. I use liberal amounts of well dried, pulverized cow manure or leached chicken manure (rained upon for some time) as a top dressing in late April or early May. This could be lightly dug in as the *Kleinias* are not "top feeders." The plants are mostly "foliage" plants as the flowers are not breath-

taking although I have found them interesting. The delicate purple bloom on the grooved conical buds of *K. repens* against the bluish leaves is a picture for color enthusiasts. The open flowers are purple striped on chartreuse or greenish yellow. *K. pendula* and *K. stapeliiformis* have beautiful scarlet "duster type" flowers. *K. gomphophylla*, a rare vining type with round stems instead of the long ones like *K. radicans*, has cream white "dusters" at the end of mature stems.

The *Kleinias*, even the shrubby ones, are fine additions to the window gardens. *K. articulata* is a bluish gray cigar-shaped plant and is nice to give friends because of its "eternal life" when cut and potted. *K. pendula* has a semi-transparent look of greenish purple stripes; crawls over itself and soon fills all available space in a pot. Good for hanging over edges, too. *K. radicans* vines, even forms hanging baskets and roots down into the soil wherever it touches; it has small oval pointed leaves along its stems. *K. repens*, as I have said, is a must; its bluish coloring on the new growth is a thing of beauty for window gardens during the winter gloom. *K. stapeliiformis* is also good but it does have a tendency to die back to the ground at times but if not overwatered the new shoots reappear near the edge of the container. I have tested these and I know they will stand window culture if kept in a cool, well ventilated location.



FIG. 21

*Kleinia articulata* is the common plant that Dr. A. D. Houghton had planned to write up as the best example of true succulence. Its determination to survive is characterized in four ways: 1. By its spreading stolon-like roots which form matted clusters of plants. 2. Easily detached joints or sections of the stems that easily root wherever they contact soil. 3. During good times leaves are produced for the speedy production of food that is stored in the stems; during drought periods, the leaves are discarded to conserve moisture. 4. The normal production of flowers and seeds under favorable conditions. S. E. H.

\*True name is *Senecio stapeliiformis*—see *Succulents for the Amateur* pg. 74.

The plant of the month is *Kleinia tomentosa* (see good illustration in *Succulents for the Amateur*, Fig. 137). This white plant is one of the most desirable of the genus but, like most of this type, it is also one of the most difficult to keep in good health. The green watery leaves are encased in a white tomentum or felt-like covering which can be peeled off and examined as if it were a sample of cloth. I have had my plant in the same pot for four years. Small pot, too, but I add a top dressing of manure to keep it in good health. It has not grown too fast but there are two side offsets from below ground on the original stem. Mine is the original species which is called *K. tomentosa* while the larger more robust one sold here is called var. *gigantea* or var. *robusta*. I keep mine in the same location summer and winter, in good light and where temperatures stay steady. It likes to be kept on the dry side during the coldest part of the year but I water mine almost daily during the summer growing season. When I remember the fine specimens that my friends have owned and lost during the last five years I do not regret my small well-shaped plant which grows slowly but steadily. It was a top cutting 2 inches high when I bought it 5 years ago. Now it is six inches tall with two three-inch offsets. I never get effusive praise for my "beautiful succulent succulence" but I usually get a grudging comment that mine survived. I have also won several first prizes for well-grown plants so I'm satisfied to be able to grow hardy plants and tell you about them.

Next month *Lophophora* and Plant of the Month *L. Williamsii*.

JOHN E. C. RODGERS,  
1229 Eighth St., Lorain, Ohio.

### BOLIVIAN CACTI

The following summary is from an eight-page article (6 illus.) in *Folia Universitaria* (1948), Cochabamba, Bolivia, by Dr. Martin Cardenas:

"Dr. Leo E. Miller, ornithologist from the American Museum of Natural History of New York, when journeying through Bolivia in 1915, was attracted by the cactus formation of the center of this country and named this 'The Cactus Forests.'

"Last year we had to cross this famous forest on our way to the Upper Rio Ichilo and found that the mentioned formations are very interesting from the point of view of the Cactaceae geographical distribution in South America. The center of Bolivia is really the center of South America itself, thus it is a place where converge three floral elements, which are the Andean, the Brazilian and the Argentinian.

"Among the main representatives of this Cactus Forests which extends about 30 to 50 miles, between Huerta Molino and Samaipata in the high way Cochabamba-Santa Cruz, we can mention the following:

"*Neoraimondia macrostibas* (Schum.) Britt. & Rose, called by the Indians 'Carapari' and found only in the center of Bolivia out of its type locality which is the western coast of Peru. The Bolivian 'Carapari' seems, however, to be slightly different from the type specimen by having a definite trunk about 50 cm. in diameter and the longest spines no longer than 20 cm. It is curious how this cactus does not appear in between the west coast of Peru and the center of Bolivia.

"*Eriocereus tephracanthus* Riccobono, called vernacularly 'Ulala,' it is perhaps the Bolivian cactus which attains the largest area of distribution and so it is found out of the Cactus Forest, in Cochabamba and Sucre valleys and surrounding hills.

"*Opuntia kiska-loro* Spegazzini, was mentioned only from the Northwestern deserts of Argentina. Thus

our finding this species in the Comarapa region at the Cactus Forests of Bolivia is a first record for this country.

"*Opuntia Salmiana* Parmentier. On the basis of this rare species, Britton and Rose created the monotypic Series *Salmianae*, saying then that this cactus was said to have come from Brazil, without a definite locality given and not been collected there in recent times. According to the same authors, if really Brazilian this species doubtless comes from the south, since the related formerly described species *O. albiiflora* and *O. Spegazzinii* come from Paraguay and Northern Argentina respectively. We have found, for the first time, this species at Comarapa which is the center of Bolivia.

"*Pfeiffera ianthobele* (Monville) Weber. According to Britton and Rose, Montevideo is cited as the type locality for this little cactus and its distribution area Northwestern Argentina, specially Salta, Tucumán and Catamarca. As a first record for Bolivia again, we collected this plant at Comarapa, growing either as terrestrial or epiphytic.

"*Quiabentia Zebtnerii* (Britt. & Rose) Backg. Britton and Rose described this cactus as a very rare plant under the name *Pereskia zebtnerii* and said to be seen in only one locality, in a soil of a peculiar chalky formation at Bahia, Brazil. We found a plant with characters of the original description of *Pereskia zebtnerii*, at Pérez in the Center of Bolivia and it is doubtless the same species.

"By the above examples, we consider the Cactus Forests of the Center of Bolivia, a very interesting place to be visited by cactologists." M. C.

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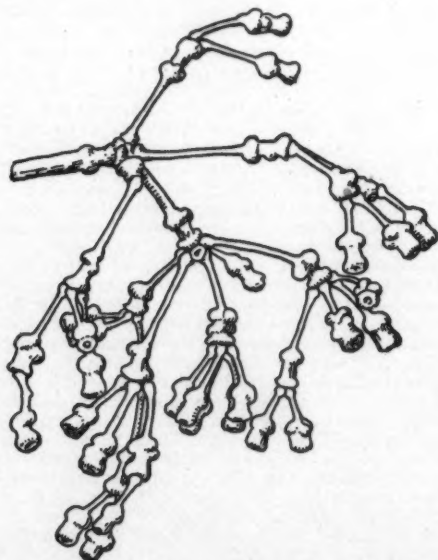


FIG. 22. *Hariota salicornioides*—See next page. See illustration in *Cacti for the Amateur*, Fig. 106.



# SPINE CHATS

LADISLAUS CUTAK



*Hariota salicornioides* is an unusual looking type of cactus which comes from the forests of southeastern Brazil. The slender branchlets are club-shaped, sometimes contorted in the apical portion so that the whole plant looks like a hodge-podge of very small skeletons or a jumble of bones. Each slender branchlet is quite pedicel-like in its lower part, while the upper often resembles a bone joint, the whole up to 3 cm. long. The pedicel portion is usually purplish while the upper is more or less greenish.

Flowers come in January and arise from the enlarged woolly areole at the tip of each joint, often solitary or in pairs. Succeeding branchlets likewise arise from the terminal areoles. The flowers are small, about 10 mm. long, deep yellow in color. The stamens are distinct, erect, with pale yellowish filaments. The style is longer than the stamens, of a pale yellow color, and crowned by 5, white stigma lobes.

In its native habitat, *Hariota salicornioides* grows on trunks of trees, attaching itself by means of long and fibrous roots. The stems at first are erect, but become pendent in age by their weight. Hariotas are very closely related to *Rhipsalis*, with which genus they are sometimes united. The flowers of both genera are without a tube, but the petals of *Hariota* are erect while those of *Rhipsalis* are usually widely spreading. Then, too, the flowers of the former are always terminal, while in *Rhipsalis* they can be lateral as well as terminal.

*Hariota salicornioides*, like all the Rhipsalidanae, requires no special care and can be grown like a fern. Grow it in a light compost of leafmold, sandy loam, and chopped up osmundine or orchid peat, but the latter is not absolutely needed unless available. Water moderately all year round, although an occasional drying out won't hurt it.

Dr. Juan Iwersen, one of the best known physicians in Mexico City and an ardent cactophile, died on December 10th last at his home after a lingering illness of nearly a half year. For the last 3 or 4 weeks there was only a very slight chance that he might survive, but it was too much for him, and after having been unconscious for about 30 hours, he died calmly at 3:45 in the afternoon. The doctor would have celebrated his 57th birthday next April. He first became enthusiastic about cacti several years ago and in a remarkable short time acquired extensive knowledge about these plants. Whenever away from his office, he would retire to his garden and devote as much time as he could to his pets. At other times he would drive out and explore likely cactus regions and bring back new material to enhance his collection. One of his favorite haunts was Zopilote Canyon in Guerrero; others were the barrancas around Tuxpan in Michoacan. It was Dr. Iwersen who largely made it possible for me to spend two weeks in Mexico City in 1946 and extend my collecting operations into several states of the Central Plateau. We had planned to botanize together along the wild Balsas River but this trip had to be postponed when an emergency case demanded the doctor's presence at the hospital.

Born in Seegeberg, Germany in 1892, Dr. Iwersen

studied medicine after completing his primary schooling and served as a doctor in World War I. After the war, when things looked pretty gloomy in Europe, he left for Mexico in 1923 and settled in Morelia, Michoacan, where he did much good and was very much esteemed by everybody. His four lovely daughters—Gerda, Ine, Helga and Gesche—were born in Morelia. In 1931 the Iwersens moved to Mexico City and there the doctor distinguished himself in his profession and made many friends.

To Mrs. Iwersen and the girls I extend the sympathies of the cactus society, whose members cherished him as one of the outstanding cactophiles in Mexico.

\* \* \*

Mr. Irwin M. Krohn, another distinguished friend of mine and of the cactus fraternity, passed away on December 11th after an illness of eight months. To those of you who had attended the convention in Cincinnati, his death will be a shock, for he was the gentle little jovial man, who as President of the Board of Park Commissioners, welcomed us to the Queen City. My fondness for Mr. Krohn dates back to 1939 when I was invited to dedicate the Cactus Wing of the Krohn Conservatory (named in his honor for his untiring work) in Eden Park. This gentleman was a devoted leader in Cincinnati's public service. It was in 1912 when Mr. Krohn first became associated with the Park Board and later became its head.

Irwin M. Krohn was born in Saugerties, New York, on April 5, 1869, where his father was mayor, but at the age of 5, the family moved to Cincinnati and has lived there ever since. After finishing high school, young Krohn went to work in his father's cigar factory and later switched to the shoe business until his retirement in 1922. From that time on he devoted his energies to public work. Mr. Krohn was a great lover of plants and when the cactus craze struck the country he soon realized that it would last; so to keep in step with the times he planned a collection of these fascinating plants with the help of the KIO Cactus Club and today Cincinnati has a very fine cactus house that it can be justly proud of. My sympathies are extended to the immediate family and to the KIO Cactus Club who have lost a staunch supporter in the death of Irwin M. Krohn.

\* \* \*

Edwin B. Kurts, Jr. of the University of Arizona made a study of the pollen grains of cacti native to Arizona and found out that the grains were of two forms, which further could be subdivided by size, sculpturing of exine, and number and position of germ pores, so that the genera, subgenera, and some species may be distinguished by them. At least 75 species and varieties were studied. Technical data appeared with the article in the September, 1948, issue of Bulletin, Torrey Botanical Club (75:516-522).

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## BOOK NOTES

ARIZONA HIGHWAYS MAGAZINE—Christmas issue 1947. Contains 27 beautiful cactus and desert plants in color. The two cover pictures 9x12 inches are worth \$5 as framed pictures of cacti. Postpaid 50c.

## BEGINNERS LIST OF "MUST" BOOKS

*Cactus for the Amateur*—Haselton. Postpaid \$3.15, Foreign \$3.15. Introduction to cacti with advice on starting a collection. Illustrated cultural information. 160 photos and color plate of 110 named cacti.

*Succulents for the Amateur*—Brown. Postpaid \$3.15, Foreign \$3.15. Introduces one to 800 best succulents with 400 illustrations of named species including a color plate of 75 beautiful succulents.

*Succulent Plants*—Jacobsen. The revised edition of the most complete book on the other succulents is now available. There are over 300 illustrations with descriptions of 1000 species; mentions as many more in the 293 pages. English edition \$6.50, foreign \$7.00.

*Glossary of Succulent Plant Terms*—Marshall & Woods. Postpaid \$3.65. Pronunciation of the plant names with illustrations. Botanical terms explained in simple language. This book is necessary for a full enjoyment of cacti and the other succulents.

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## YEAR-BOOK OF THE SWISS CACTUS SOCIETY\*

"Sukkulentenkunde II," August, 1948, contains 64 pages, 21 illustrations and many excellent contributions to the knowledge of succulent plants. There are three natural color plates: *Conophytum Tischeri* Schick, *Lithops optica* var. *rubra* Tisch. and *Lithops Lericheana* Dtr. et Schw.

Among the most interesting articles is one by Curt Backeberg "Akers' New Genus *Peruvocereus* or Backeberg's *Haageocereus*" in which he reduces Aker's *Peruvocereus* to varieties of *Haageocereus*. Mr. Myron Kimnach translated this as soon as possible so that we can understand the reasons for the changes.

Prof. Dr. phil. habil. Franz Buxbaum has another well-illustrated paper on the clarification of the physiological position of the Aizoaceae and the Cactaceae in the plant kingdom.

Among the new species and varieties are:

*Lobivia Peckardiana* Krainz and its new varieties  
*Winteriae* Krainz, and *albiflora* Krainz.  
*Notocactus rutilans* Daen. et Krainz.  
*Mammillaria pennispinosa* Krainz.  
*Mammillaria Marksiana* Krainz.  
*Loxanthocereus Keller-badensis* Backbg. et Krainz.  
*Rebutia Krainziana* Kesselring.  
*Rebutia Wessmeriana* Bewerunge.  
*Gymnocalycium Queblanum* (F. Hge.) Berg., var.  
*Zantnerianum* Schick and var. *Rolfianum* Schick.  
*Mediolobivia Kesselringiana* Cullmann.  
*Tubincarpus Klinkerianus* Bckbg. et Jacobs.  
*Parodia Schutziiana* Jajo.  
*Gymnocalycium guanchinense* Schutz.  
*Stapelia inducta* Nel.  
*Ophthalmocephalum Lydiae* Jacobsen.  
*Arenifera* Herre. A new genus into which he transferred Dr. Bolus' *Psammophora Pillansii*. Thus *Arenifera Pillansii* (L. Bol.) Herre.

\*We can order a copy for \$1.50. "Sukkulentenkunde" I is available for \$1.00, Box 101, Pasadena, California.

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